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MARCH/APRIL 1983 VOL. 1 ISSUES 4/5

COMMANDER

The Monthly Journal for Commodore Computer Users

INSIDE:

- Mine Field
- Ravings of a Madman
- Bits & Pieces
- New Products

- Game Reviews
- VIC 20: Assembly Language Programing

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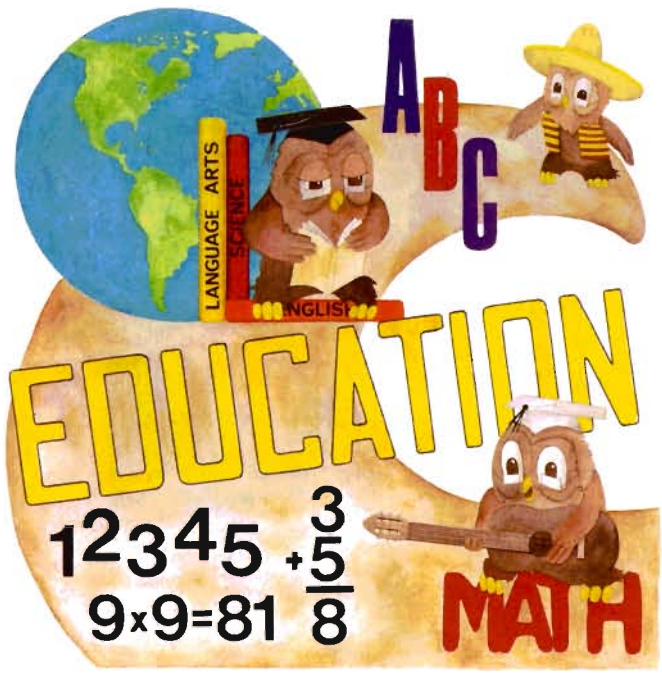

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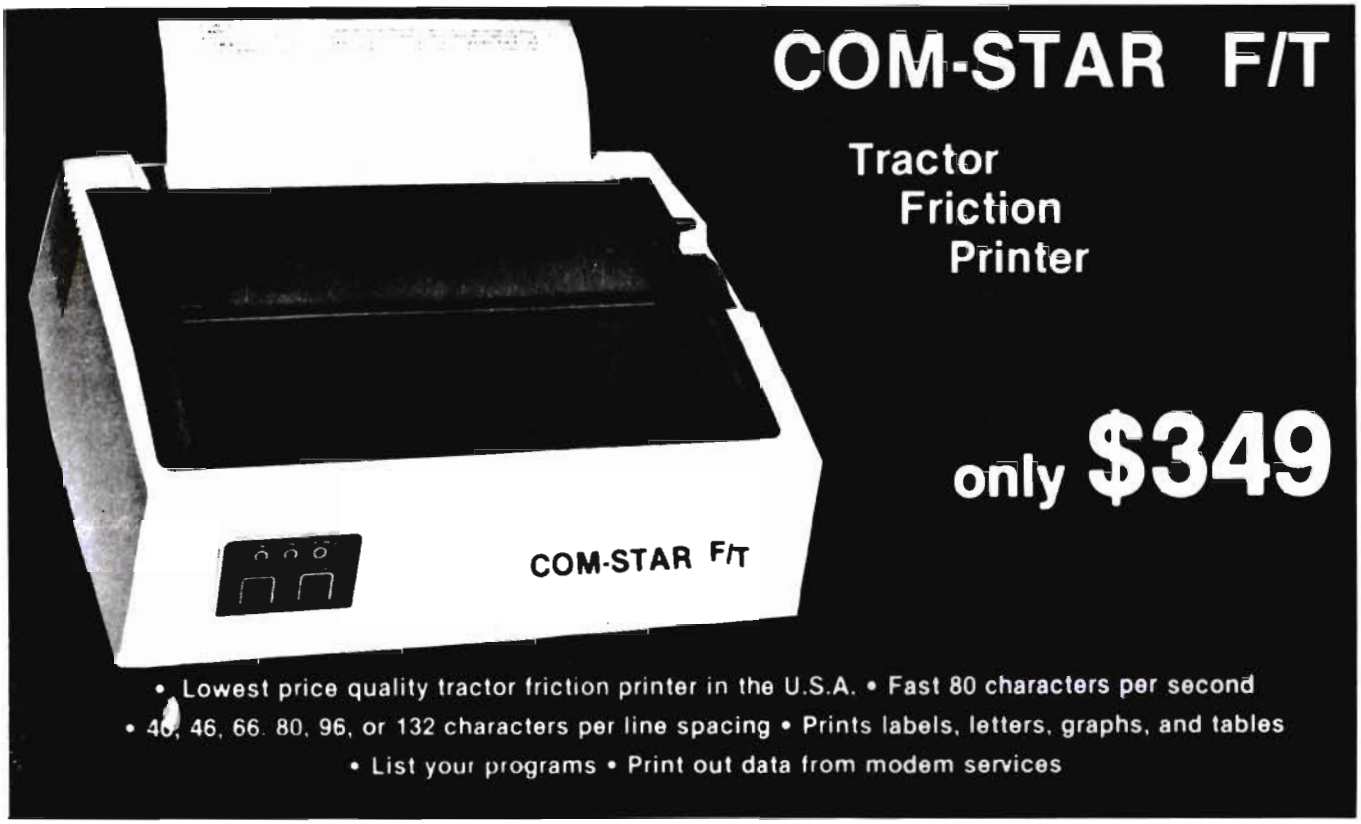
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ABOUT THE COVER:

Our Cover by Randy "Tarkas" Hoar is a representational piece that places the VIC 20 in its rightful realm, a galaxy of capabilities.

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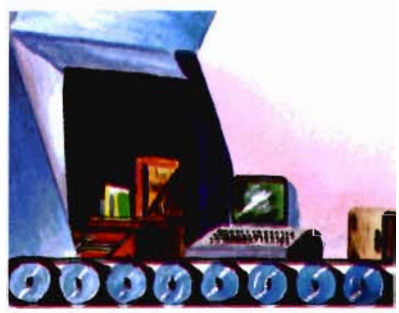

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Editorial

If rumors hold true, by the time this magazine hits the newsstands the 64 will be on sale at your local K-Mart store, probably for less than $350.00. And once again Commodore will have earned lots of points with its dealers. Commodore seems to be following a policy of establishing a successful product in the marketplace with its dealers and then turning the mass merchandisers loose to sell hundreds of thousands of computers. It worked well for the VIC-20 and will probably do the same for a $300 64; but how long will the dealers hang with it?

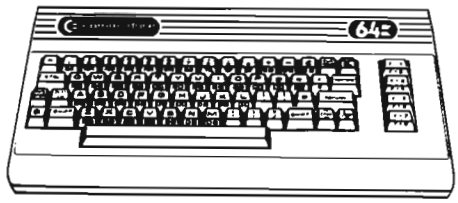
The current pipeline has the new 128K byte machines coming in to replace the 64 which is undergoing an early change of life—it is in transition from a low end business machine to a high end personal computer. A wise decision on Commodore's part as any 'business' computers in todays market must have a 16 bit processor—an 8 bit machine will not easily find acceptance as a business machine, primarily because of the existence of IBM.

The new 128K machines will be the mainstay Commodore business computers for the next couple of years. The really exciting news should come with the release of the Z8000 machine. I predict (hope) that the Z8000 machine will be a high end 64K personal computer eventually sold en masse at a discount price of $300. Coupled with a slick 64 type Video Display Generator, the CZ8000 would become a tough critter for **any** company to top. It could easily do the work of a small business computer and allow some of the finest entertainment and educational software around since it will run 5-10 times more efficiently than a Z80 or 6502. We here at Commander are anxiously awaiting the release of the CZ8000 and are boning up on our Z8000 programming in the meantime. We just hope the dealers aren't so burned out that they refuse to take it. The inexpensive CZ8000 will become the dominant personal computer of the 1980s.

What Happened to March?

A note for the Baker Street crowd in our midst: the March issue of Commander has not been abducted. It has gone the way of the too rapidly expanding magazine. The March issue has been renamed March/April so that its time phasing on the newsstands will be proper. All subscriptions prior to March are automatically being extended by one month and subscriptions scheduled to start in March will start in April. We apologize for any incovenience caused by this action. Thanks for your patience.

COMMODORE 64



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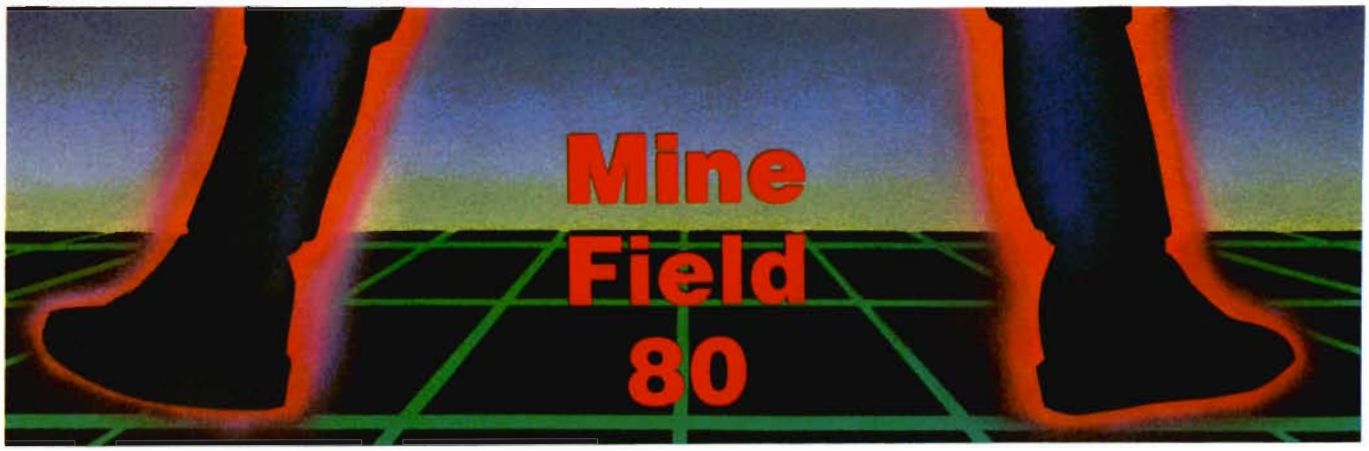


by Howard Rotenberg
Ontario, Canada

Mine field is the first game that I had written for the PET 2001 back in August of 1980. The reason Mine Field 80 came into existence was because of the lack of games available for the 8032. When all the day's business was done and we wanted to relax with a game or two we usually had only 40 column games. This problem was overcome by Chuan Chee of St. Catherines, Ontario, with a program called CBM 4032. This was published in the May 1981 issue of Compute on page 130.

The program was excellent in that it took care of all the pokes to the screen by simulating a 40 column screen in the middle of our 12 inch screen. The only thing left to do on some games was to change the keyboard decoding for the business keyboard as this had been a major difference from the older models. At this point I had better stop before I start discussing the keyboard decoding changes and lose sight of game that I started to write about.

To briefly recap, Mine Field 80 is a revamped version of Mine Field that uses the whole 80 column screen for the playing field. It is a relatively straight forward game to play, although much harder to win than it may first appear.

The game board consists of a rectangular fenced-in area that is an old abandoned mine field (HENCE THE NAME). Scattered about the field are pieces of gold that were left behind by the fleeing army years before. There are also a number of mines that are still armed and ready to explode at the slightest touch. Your mission is to try to collect all the gold pieces within a certain time limit while avoiding the mines or the fence, that will also explode if you happen to run into it.

"Resting" Option Available

Your control is the numeric keypad that you will use to maneuver around the field. The starting position is the upper left hand corner which also happens to be the only way into the field. The time you have to collect the gold pieces is dependent on the number of mines you choose to risk. You have 9 speeds to choose from although I must say if you want a chance to win the game you will probably have to use at least number 8 (THE SECOND FASTEST). I recommend a slower speed at first to get the hang of the game. The option to stand still and rest a second is available by pressing the number five key. This will give you time to think of the best way to continue your attack. I suppose that I should mention that when resting, a stray enemy aircraft is likely to bomb you if he passes by since there seem to be a few enemies who don't realize that the war is over. The time you may rest may vary from a split second to ten to fifteen seconds if you are lucky, however if you are familiar with the COMMODORE's random number generator then I would suggest not pressing your luck.

Variables Listed at Beginning of Programs

All the variables are listed at the beginning of the program listing so the program may be easily modified back to a 40 column or even 22 column program for the VIC. The only other changes will be the locations that I use to poke the playing field to the screen. All the movement is done by the good old programmable cursor so all the newcomers to the COMMODORE world may see how to move objects around the screen. This is one of the few features that seem to have remained the same in all of COMMODORE'S computers (CHALK ONE UP FOR COMMODORE). I have also used CB-2 sound for various clicks and buzzes. All the routines in the program are documented by rem statements that may have to be removed to fit the program into a VIC with no memory expansion. There is also a small machine language subroutine poked into memory at 634 or $027a hex that will have to be changed or excluded if used on a VIC or 64. For a 40 column Pet just change the 88 in the second data statement to 84. For the COMMODORE 64 you must poke the routine with the same change just mentioned into a memory space that you have free. I can not suggest a proper spot for the routine if relocated but then again this is supposed to be a biased article for us minority 80 column users.

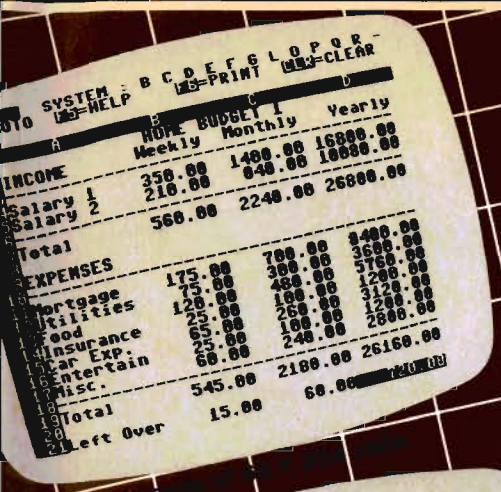
Good luck in your daring endeavors and remember that tempting number five key, because RESTING can be very DANGEROUS.□

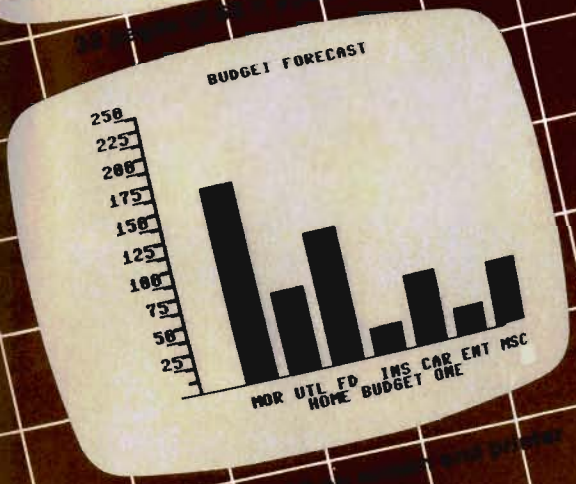
```
10 REM*****************************************************************
20 REM*                                                               *
30 REM*                        MINE FIELD 80                          *
40 REM*                             BY                                *
50 REM*                       HOWARD  ROTENBERG                       *
60 REM*                        TORONTO ONTARIO                        *
70 REM*                                                               *
80 REM*     S    = SCORE                    G    = HIGH SCORE         *
90 REM*     REG  = WRITE(15)                SND  = SHIFT RATE(16)     *
100 REM*    T    = NUMBER OF MINES          PIT  = FREQUENCY          *
110 REM*    M    = SPEED EQUATION           N    = SPEED              *
120 REM*    H    = PEEK AT SCREEN           B    = DIRECTION          *
130 REM*    Z    = GETS DIRECTION           T1   = TIME FOR GAME      *
140 REM*    V    = RND NO. FOR SUB          L    = RND NO. FOR SUB    *
150 REM*    W    = VARIABLE FOR WIN         W1   = GAMES WON          *
160 REM*    T2   = TEMP FOR TIME            A    = TIME GAME STARTED  *
170 REM*                                                               *
180 REM*****************************************************************
190 REM
200 REM*************************************
210 REM*     GIVE INSTRUCTIONS AND         *
220 REM*         BEGINING OF GAME          *
230 REM*************************************
240 PRINT"■":CLR:GOSUB1880:GOSUB1610
250 REM
260 REM*************************************
270 REM*        INPUT FROM USER            *
280 REM*           FOR  SETUP              *
290 REM*************************************
300 REM
310 S=0:W=0:SND=59467:REG=59466:PIT=59464
320 PRINT"■": INPUT"HOW MANY MINES?  MINIMUM=60    60■■■■■";T
330 IFT<60THENPRINT"■■":GOTO320
340 PRINT"■"
350 PRINT"HOW FAST 1-9":GETN$:N=VAL(N$)
360 IFN<1ORN>9THENPRINT"■■":GOTO350
370 PRINT"■":M=N*50:B=6:H=32847:T1=T+(T*.2)
380 PRINTTAB(10)"YOU HAVE"T1"SECONDS TO GET AS MANY GOLD PIECES
     AS POSSIBLE"
390 FORI=1TO3000:NEXT:PRINT"■"
400 REM
410 REM*************************************
420 REM*           SET UP BOARD              *
430 REM*************************************
440 REM
450 GOSUB 1210
460 A=TI
470 FORJ=1TO500-M:NEXT
480 IFS=WTHENPRINT"■CONGRATULATIONS YOU GOT THEM ALL":W1=W1+1
     GOTO1490
490 IFTI-A>T1*60THEN1450
500 REM
510 REM*************************************
520 REM*     GET DIRECTION AND             *
530 REM*         MOVE MAN                  *
540 REM*************************************
550 REM
560 GETZ$:Z=VAL(Z$):IFZ=0THEN Z=B
```

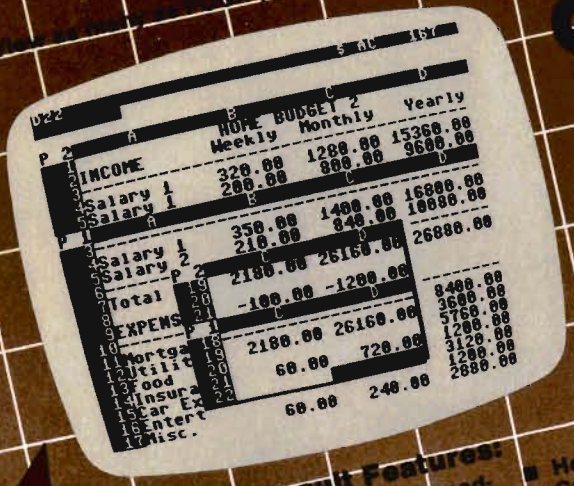
```
570 ONZGOTO820,620,860,660,970,580,780,700,740
580 IF Z=6 THEN B=6
590 H=H+1:IFPEEK(H)= 86THEN1080
600 IFPEEK(H)=90THENGOSUB1370
610 PRINT"■■ ●";:GOTO470
620 IF Z=2 THEN B=2
630 H=H+80:IFPEEK(H)= 86THEN1080
640 IFPEEK(H)=90THENGOSUB1370
650 PRINT"■■ ■■●";:GOTO470
660 IF Z=4THEN B=4
670 H=H-1:IFPEEK(H)= 86THEN1080
680 IFPEEK(H)=90THENGOSUB1370
690 PRINT"■■ ■■●";:GOTO470
700 IFZ=8THENB=8
710 H=H-80:IFPEEK(H)= 86THEN1080
720 IFPEEK(H)=90THENGOSUB1370
730 PRINT"■■ ■■●";:GOTO470
740 IFZ=9THENB=9
750 H=H-79:IFPEEK(H)=86THEN1080
760 IFPEEK(H)=90THENGOSUB1370
770 PRINT"■■ ■●";:GOTO470
780 IFZ=7THENB=7
790 H=H-81:IFPEEK(H)=86THEN1080
800 IFPEEK(H)=90THENGOSUB1370
810 PRINT"■■ ■■■●";:GOTO470
820 IFZ=1THENB=1
830 H=H+79:IFPEEK(H)=86THEN1080
840 IFPEEK(H)=90THENGOSUB1370
850 PRINT"■■ ■■■●";:GOTO470
860 IFZ=3THENB=3
870 H=H+81:IFPEEK(H)=86THEN1080
880 IFPEEK(H)=90THENGOSUB1370
890 PRINT"■■ ■●";:GOTO470
900 REM
910 REM*********************************
920 REM*  2 RANDOM NUMBERS TO BLOW    *
930 REM*     YOU UP IF TOO LONG       *
940 REM*           ON FIVE            *
950 REM*********************************
960 REM
970 IFZ=5THENB=5
980 L=INT(10*RND(1))
990 V=INT(10*RND(1)):IFL=VTHEN1480
1000 GOTO470
1010 REM
1020 REM*********************************
1030 REM*   SUBROUTINE TO BLOW UP      *
1040 REM*       IF MINE IS HIT         *
1050 REM*       AND PLAY AGAIN?        *
1060 REM*********************************
1070 REM
1080 T2=TI-A:FORX=1TO30:POKE59468,194:POKE59468,12:SYS634
     :NEXT:PRINT"■"
1090 PRINTTAB(12)"YOU COLLECTED"S" COINS BEFORE YOU WERE
     BLOWN TO #$%#^"
1100 PRINTTAB(12)"■■UNFORTUNATALY YOU LOST THEM ALL DURING
     THE EXPLOSION■■"
```

```
1110 PRINTTAB(12)"YOU HAD"INT((T1*60-(T2))/60)"SECONDS LEFT"
     :N=2000
1120 FORJ=1TON:NEXT:POKE158,0:INPUT"CARE TO TRY YOUR LUCK AGAIN
     Y■■■■";A$
1130 IFLEFT$(A$,1)<>"N"THEN310
1140 PRINT"THANKS FOR PLAYING"
1150 PRINTCHR$(14):END
1160 REM
1170 REM**********************************
1180 REM*          SET UP BOARD          *
1190 REM**********************************
1200 REM
1210 PRINTTAB(11)"THERE WILL BE A BRIEF PAUSE AFTER THE BOARD IS
     SET UP"
1220 FORJ=1TO2000:NEXT
1230 PRINT"":FORJ=1TOT:D=INT(1840*RND(1)):POKE32848+D,86:NEXT
1240 FORJ=1TOT/1.3:D=INT(1840*RND(1)):POKE32848+D,90:NEXT
1250 FORJ=32767TO32847:POKEJ,86:NEXT
1260 FORJ=32847TO34808STEP80:POKEJ,86:NEXT
1270 FORJ=32848TO34887STEP80:POKEJ,86:NEXT:POKE32848,32
1280 FORJ=34688TO34767:POKEJ,86:NEXT:PRINT"8"
1290 FORJ=32768TO34767:IFPEEK(J)=90THENW=W+1
1300 NEXTJ:RETURN
1310 REM
1320 REM**********************************
1330 REM*   SUB FOR SOUND ON GETTING    *
1340 REM*        GOLD PIECE             *
1350 REM**********************************
1360 REM
1370 POKESND,16:POKEREG,15:FORJ=255TO250STEP-1 :POKEPIT,J:NEXT:
     POKESND,0
1380 POKEREG,0:S=S+1:  RETURN
1390 REM
1400 REM**********************************
1410 REM*        GIVE SCORE AND          *
1420 REM*         PLAY AGAIN?            *
1430 REM**********************************
1440 REM
1450 IFS>GTHENG=S
1460 PRINT"":PRINTTAB(23)"SORRY TIME IS UP!! YOU GOT"S"COINS"
1470 PRINTTAB(23)"YOUR HIGHEST SCORE IS"G"COINS:?
1480 PRINTTAB(23)"YOU HAVE WON";W1"GAMES"
1490 FORJ=1TO2000:NEXT
1500 PRINT:POKE158,0:INPUT"PLAY AGAIN   Y■■■■";A$:PRINT:GOTO1130
1510 REM
1520 REM**********************************
1530 REM*       HIT BY BOMBER ON 5       *
1540 REM*         PLAY AGAIN?            *
1550 REM**********************************
1560 REM
1570 POKESND,16:POKEREG,51:FORJ=0TO255:POKEPIT,J:NEXT:POKESND,0
1580 PRINT"":FORJ=1TO2000:NEXT
1590 PRINTTAB(23)"YOU WERE HIT BY A BOMBER!!"
1600 PRINTTAB(23)"RESTING CAN BE DANGEROUS":GOTO1120
1610 INPUT"DO YOU NEED INSTRUCTIONS     Y■■■■";A$:IFLEFT$(A$,1)<>"Y"
     THENRETURN
1620 REM
```

```
1630 REM*********************************
1640 REM*      GAME INSTRUCTIONS        *
1650 REM*********************************
1660 REM
1670 PRINT"■"
1680 PRINT:PRINT"YOUR MISSION IS TO MANEUVER THROUGH THE MINES × ←
      TO GET THE"
1690 PRINT"GOLD PIECES ● ← LEFT BEHIND BY THE FLEEING OPPONENT ARMY."
1700 PRINT"■■■YOUR CONTROLS ARE:■"
1710 PRINT"                              7 8 9
1720 PRINT"                               \|/
1730 PRINT"                              4-5-6
1740 PRINT"                               /|\
1750 PRINT"                              1 2 3
1760 PRINT"■IF YOU HIT A MINE YOU BLOW UP!  YOU CAN REST
      FOR A ■SHORT■";
1770 PRINT" TIME ON NUMBER 5 BUT"
1780 PRINT"YOU MIGHT GET BOMBED IN A SNEAK AIR ATTACK BY A STRAY
      ENEMY."
1790 PRINT:PRINT"THIS PROGRAM FEATURES CB-2 SOUND!
      HAVE FUN AND GOOD LUCK."
1800 PRINT:PRINT"PRESS RETURN TO BEGIN"
1810 GETA$:IFA$<>CHR$(13)THEN1810
1820 RETURN
1830 REM
1840 REM*********************************
1850 REM*          BEGINING             *
1860 REM*********************************
1870 REM
1880 PRINTCHR$(142)"■■■■■■■■■■■■■■■■■■■■■■■■■";
1890 FORA=1TO20:FORJ=1TO80:NEXTJ:PRINTTAB(34)"■■■■■■■■■■■■■■■■■■■
```







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Formatting and Error Checking —A Time Saving Algorithm

by Tony LaMartina
Pittsburg, PA

The attached demonstration program shows how to format columnar number formats so that the decimal points always align. There are several ways to accomplish this task. The initial program listing is a simple, easy to understand way to align the decimal points for columnar numbers rounded to two decimal places. Further enhancement of the initial program demonstrates error trapping.

Lines 10 and 30 inputs our data for mathematical manipulation. In this case, we're inputting A and B to be divided, with the result being C.

Lines 20 and 40 take the string input and convert it to a numeric variable equal to the value of the string (A = VAL(A$). Our inputs are input as string variables to facilitate a program expansion discussed later.

As you can see, A$ is input at column 1, line 1. Input b$ is then positioned at column 21 (spc20), line 1(" ").

Line 50 rounds the result, to two decimal places via the DEFFNA statement, and line 60 does the mathematical computation.

Now the fun begins!

Line 70 converts our rounded result, (C), to a string representation. Line 80 looks at the rightmost two characters of our C$ string and assigns them to string variable X$.

Line 90 then looks at the leftmost character of string X$ to see if it is a decimal point (remember in a string the decimal point is also considered a character), meaning our answer has only one decimal place due to PET BASIC automatically truncating trailing zeros (1.55 + 55 = 3.1, not 3.10). If this condition is true then we add "0" to C$, again giving us an answer carried out to two decimal places.

Line 100 operates similarly to line 90. If our answer C is equal to the integer of C (no decimal places, 1.5#1.5 = 3 not 3.0 nor 3.00) then we add ".00" to C$, again giving us an answer carried out to two decimal places.

The key to this little routine is line 110. Since our answers (properly formatted thru lines 70-100) need to be printed in a column with the decimal points aligned, we use SPC and LEN to our advantage here.

When we print our answer, we space over 60 columns minus the length of our answer. This will align the last character of our answer, and since all our answers have been formatted to two decimal places the decimal points will automatically align too! This makes for ease of reading and is more aesthetically pleasing to the eye also.

Line 120 brings us back to line 10 for multiple entries and viewing of the formatted output column.

Now, what about the program expansion I spoke of? This expansion involves error checking to eliminate the unwanted"? REDO FROM START" that generates and ruins your formatted display. Also we'll see how to avoid the "? DIVISION BY ZERO" error that may also occur.

The addition of the following lines after each input will branch away from the error message "?REDO FROM START" prior to its display (This is why we input a string rather than a number.)

```
12 k= len(a$)
14 for j=1tok
16 if asc(mid$[a$,j,l]) < 45 or asc)
mid$[a$,j,l])>57 then
j=k:goto1000
18 next
```

Repeat these same lines as lines 32, 34, 36 and 38. Change the goto in line 38 to 1050.

Briefly, what these additional lines accomplish is this. We input a string of length K. If our string (or any single character of our string) has an ascii value of less than 45 or greater than 57 then branch out to an error alert routine. Ascii values in this range allow for numeric entries, fractional numeric entries, and negative numeric entries. All non-numeric entries will cause an error branch. Branch to what? Well, let's give our operators an audible alert to an erroneous entry and a chance to try, try again! We'll use the following lines as an "error branch to" and an audible alert subroutine. First, we'll alert the operator to the error via the built in chime present in PET/CBM 40/80 columns. (Those of you with the 2001 series will need an amplifier hooked up to the CB2 output.)

In the preceeding line 16 we used a goto 1000 for an error branch so lets begin there.

```
rem 999 rem error alert
(never branch to a rem statement)
1000 gosub 5000:rem audible alert
1010 printchr$(22)
  1020 print " ↑ ↑ ":goto20
```

For error checking line 30, our routine changes slightly.

```
1050 gosub 5000:rem audible alert
1060 printtab(10);chr$(22)
1070 print " ↑ ":goto30
```

Line 1000 directs us to gosub5000, so let's take a look at 5000+ then we'll return!

```
5000 for i=1to3
5010 poke 59467,16:poke59464,
  50:poke59466,100
5020 for t=1to100:next t
5030 poke59464,75:poke59466,175
5040 for t=1to100:next t
5050 next i:poke59467,0:poke
  59464,0:poke59466,0
5060 print "      "
5070 return
```

Line 5000 sets up a 3X loop. Line 5010 pokes location 59467 with a value of 16. This sets the shift register oscillator to a free-running condition with a squarewave output. All this means is it turns the music on! Poke 59464 and 59466 sets the tone and timbre of our musical note output.

Line 5020 gives a time delay, while line 5030 changes the tone and timbre and line 5040 gives us another time delay.

Line 5050 sends us back to line 5000 to do it all again. After 3 repetitions, line 5050 pokes all three poked locations to zero, turning off the music port and thus we return to line 1000 going to line 1010.

The values at locations 59464 and 59466 can be any value from 2 thru 254 inclusive. By varying these values and the amount of time delay, you can program your own alert or any musical ditty! (See CB2 Music Programming in the third edition of "PET PERSONAL COMPUTER GUIDE" by Osbornne, Strasma, and Strasma.)

Line 5060 could be removed and placed at line 1005. This line merely positions the cursor for what is about to happen in line 1010.

Using the CHR$ (22) command, erase line from cursor to end, we erase our erroneous entry. PET BASIC forces an automatic carriage return after any print command, therefore it is necessary to reposition our cursor up a line or two. We then goto line 20 or 30 depending, and re-input at the same space and column position we started from!

You can further error check by trapping such errors as too long of a string input:

```
55 if len(a$) 7 then 1000
115 if len(b$) 7 then 1050
```

or trapping a divide by zero error

```
135 if B$ = "0" then
    c$ = ".00":goto200
```

You will need an error erasure line for each error checking routine goto after input, as the goto changes in each case based on its associated input. The error erasure routine (lines 1000-1020 and 1050-1070) could not be made into a subroutine as the

Continued on page 34

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Machine Language I/O: Part One of Three

by Howard N. Rotenberg
Ontario, Canada

This is an article that I wish somebody else had written a while back. It deals with what I feel is one of the most important aspects of machine language and the one least documented. I speak of machine language I/O that I am sure has plagued most of us at some time. There has really been very little help for those of us trying to figure out how to talk to other devices on the IEEE bus or even just use simple input routines. I spent many hours, WEEKS to be more exact of trial and error attempting to decipher other people's code to find out the mystery behind these routines. Finally after a lot of painstaking work and about as much frustration as anyone could take, the puzzle started to come together. This is the reason that I have decided to write this three part column on this subject. The columns are not for complete beginners but rather for those with a fair working knowledge of machine language. I do not claim that the way I will present the following material is optimized to the best possible way but it does work and that is the important factor.

The first half of this article will present an all purpose machine language input routine. The second half will dive into opening files to a disk drive, reading and printing them to the screen. Part Two will deal with opening a device for both input and output. This will be demonstrated by a small terminal program for the IEEE modem. The program is straightforward and its logic may be applied to any device. The third and last part of the column will tie everything together. The knowledge and routines gained from the first two columns will be put to full use in a full blown terminal program. The program will show how to use the input routine, disk routine and the terminal routine to allow the following:

1) Open files for input or output from our input routine.

2) Check for any disk errors.

2) Talk to another computer in either ascii or petascii via a modem.

4) Utilize the IEEE routines for using the bus.

5) Send or receive files via a modem.

6) Most importantly be able to do all the above simultaneously.

I have specified the routines that are Rom dependent by giving the upgrade Rom addresses in the constant table at the beginning of each program. The program was, however, written using BASIC 4 Rom locations. If one felt really ambitious he could disassemble the Rom routines and use them so his programs would be completely Rom independent. Some proprietary software is done this way to lessen the maintanence needed after release. I will show how some of these Rom calls could be implemented to make them machine independent. With all this in mind we can now dive into the first routine and slowly work our way to complete control over our computer. The first two routines will be discussed with much more detail than the following ones in the next column since they will be based upon these routines.

The first routine is an input routine that should work on all COMMODORE computers with the change of the load address and our temporary buffer that I chose to call BUF1. It uses the kernal routines WRITE $FFD2 and GETCHR $FFE4. These are the same on all of COMMODORE'S computers. The constants are all labeled and should be self-explanatory. I chose the number 10 for the limit of input characters although you may wish to change this or not limit it at all.

Since we are going to store our input characters into a temporary buffer it is important to make sure that all your text will fit without overwriting anything else.

As we start to examine the routine the first task I perform is to clear the buffer area that I will be using. In this case I fill the ten positions with spaces. We enter the input routine by printing a half cursor to the screen designed out of the character CHR$(185). Our first character will be printed where our mock cursor is sitting because we backspace over it. The Y register is used as an index or counter for our input string. We must save this before going to the keyboard for a character since the routine JSR GETCHR uses it and we will lose our count. After we have our character we must store it so we may restore our counter at which point we go back for our entered character. At this point we do a few checks on the character we have entered. If it is a delete then we must go to the second part of the routine to do this. We will discuss how it works when we get there. If it is a quote, we don't allow its entry and go back for another character (JUST FOR FUN REMARK OUT THE CHECK FOR THE QUOTE AND SEE WHAT HAPPENS). A carriage return denotes the end of our input and exits the routine. Assuming that all the above checks fell through then we have our character and store it in our buffer for later use. Our index counter Y is incremented at this time. If the maximum number of characters that were designated at the beginning of the program are met then we procede to a wait routine. This will allow us to change our input or let us leave by entering a carriage return. The routine also stores the index and entered character in the same way as before.

This now leaves us at the end of the routine that will delete a character for us. The first thing we check is to see if there are any characters to delete. This is accomplished by comparing the index register Y to zero to see if any characters were entered prior to the calling of this routine. If this is the case

then we return to our main input routine. Having determined that there is indeed at least one or more characters to delete, the following steps occur:

1) The position of our invisible cursor is placed over the character to be deleted.

2) We overwrite the character to be deleted and our mock cursor with a space.

3) We position our invisible cursor back to the place our deletion took place.

4) We decrement our character count by one even though the character is still in the buffer.

5) We go back to our input routine which will print the new mock cursor and continue.

This is all there is to it. We have created an input routine that may be used in any way we please. Does it seem as confusing as you thought it might have been or does it seem to make sense after looking at it for awhile? I have put the characters into a buffer for the following reason. At a later time I intend to transfer them to another buffer. This will be the address of a file name that I will use to open on the disk, however let's not rush into that yet.

We have just seen a routine that fills a buffer with X number of characters. Well, let me see them, you may be thinking. At this time you may access them from BASIC to validate the input. Here are two ways to accomplish this.

```
FOR J=634 TO 643: PRINT
CHR$(PEEK(J));: NEXT
```

This assumes you used the entire ten characters and will display all of them. You may change the count to utilize your input. This next example will take what is in the input buffer and assign it to A$. Be sure that your buffer does not exceed 255 characters and note that there is no semicolon after CHR$(PEEK(J)).

```
FOR J=634 TO 643: A$=A$+CHR$(PEEK(J)): NEXT: PRINT A$
```

If you wanted to, you could use a large chunk of memory for your buffer and then store it to disk for later use, or print it as it sits. Is anyone game for writing a word processor?

This takes us to the second half of part one of this column. The program we will be looking at now is for opening a disk file for reading. Unlike opening a file in BASIC there are a lot of factors that we must take care of. These are things that are done for us by the BASIC interpreter that are user invisible. The key addresses that we must use are listed and explained here before I go into the actual internal workings of the program. I have used variable names that I hope will help the program to be partly self documentary. I have only listed the addresses that we must set that BASIC would otherwise take care of. See program 1.

As I mentioned earlier all of the above JSR routines could be disassembled and used or rewritten to make the program Rom independent. A good example of this may be shown using the routine PRMSG. It is fairly simple to implement. By examining its contents in Rom we can see that it uses the Floating point accumulator #1, so we shall do the same. The routine assumes that the accumulator holds the low byte of the pointer to our message and the Y register holds the high byte. With this knowledge we will now write our own Rom independent routine to print out a string of characters. Both routines I would like to add assume a zero byte to denote the end of our text. See program 2.

That is our routine that is no longer O.S. dependent. The same can be done with all open, close and other statements, however the coding is much longer.

Returning to our program we will start by opening the command channel. Our code is equivalent to OPEN 15,8,15. As you can see from the program we must first store the file number in FNUM (I will use my constant names for clarification). We then proceed to store the device and secondary address in their respective places. Since this is the command channel we will set the file length to zero along with the status. When all this is done we JSR to the open state-

Program 1

```
FNUM = $D2      ;FILE NUMBER
FNLEN = $D1     ;FILE LENGTH
FNPTR = $DA     ;FILE NAME POINTER
OPEN = $F563    ;OPEN FILE
OPENI = $7AF    ;OPEN FOR INPUT
DISKDS = $FFBD  ;GET DISK DS$
CLOSE = $F2E2   ;CLOSE FILE
CLEAR = $F2A6   ;CLEAR CHANNEL
GETCHR = $FFE4  ;GET 1 CHARACTER
WRITE = $FFD2   ;WRITE 1 CHARACTER
DEV = $D4       ;DEVICE NUMBER
SECADR = $D3    ;SECONDARY ADDRESS
PRMSG = $BB1D   ;PRINT A MESSAGE
```

Program 2

```
Setup:   WRITE = $FFD2      ;PRINT A CHARACTER
         PTR = $5F          ;USED FOR POINTER
         LDX #< MSG         ;GET THE LOW BYTE OF OUR TEXT
         LDY #> MSG         :GET THE HIGH BYTE
         JSR PRMSG          ;GOTO OUR NEW SUBROUTINE
Routine: PRMSG STX PTR      ;STORE THE LOW BYTE OF OUR TEXT
         STY PTR +1         ;STORE THE HIGH BYTE
         LDY #0             ;INITIALIZE INDEX
CONT     LDA (PTR), Y       ;GET A CHARACTER
         BEQ FINISH         ;IF ZERO THEN WE ARE FINISHED
         JSR WRITE          ;PRINT A CHARACTER
         INY                ;BUMP INDEX
         JMP CONT           ;BACK FOR ANOTHER CHARACTER
FINISH   RTS                ;BACK TO CALLING ROUTINE
MSG .BYTE 'THIS IS A ROUTINE TO PRINT TEXT',0
```

ment and our command file is open. As you can see from this, we must do most of the work ourselves since we don't have BASIC to fall back on.

Next we need to get the length of the file name that is held in the bytes following the label file. The file name in this case is hardcoded into our program for demonstration purposes only, although there are many applications that may need to do just this. Using the X register we cycle through the name and then save its length (HELD IN X) into a memory location called TEMP for retrieval at a later time. We will now proceed to open our file. We start out the same way as we opened our command file, storing our new information needed for a proper open. At this time we need some additional information, mainly the address of our file name. We store the low and high bytes of this address at FNPTR and FNPTR + 1 respectively. Once again we set the status to zero and then JSR to a routine to check the disk status. Like BASIC we will want to know if our open was good. At this point I would just like to remind you of a comment I made earlier about using a buffer for our input routine. In this example, as I mentioned before, the file name was hardcoded in but consider this. We put the low and high bytes of our file name into the file pointer, although we could have passed it the address of our buffer. If we would have entered a file name into the buffer, with just a little more work (NOT MUCH) we would have had the flexibility to enter our file name through our input routine. I trust that you are following the logic that I am applying or at least have you thinking about the possibilities that await us. This will be done in part THREE of this column when I tie all the loose ends together and utilize everything we have done up until then.

This puts us back to the error routine we were about to JSR to. In BASIC 4 upon entering this routine we JSR to a routine called DISKDS that will give us the proper set up for DS$. The address $0D contains the length of the disk status message and $0E contains the pointer to the place in memory that the message actually resides. For simplicity's sake, once again I have chosen to put out a hardcoded disk error message instead of the actual message contained in DS$. There is a strange occurence of the channels being closed when this message is accessed. This then results in a file not open error. Although it should be straightforward to print the error message there are a few catches that I have not ironed out yet. Any help from those readers that may know the way around this would certainly be appreciated. Back to business, we check to see if there is an error by comparing the error number to the number two. Zero and one are acceptable since they are no error or scratched file. If there is no error we return to the calling routine or else we print out our error message and set a flag that I chose to call DISKER. At this point we also return to the calling routine.

This now has us to the point where the file is opened for input and the error flag is checked. If there is an error, signaled by the flag set to one we abort and proceed to close the files. Assuming there is no error we then read the file (IN THIS CASE OUR SOURCE FILE) using a short and simple routine.

We use the two kernal routines CETCHR and WRITE to display the file to the screen. We check the status after every character just as we would in BASIC to catch the end of the file. As the end of the file is reached we branch to FINISH where we will close all files. You will notice a definite difference in the speed that the file is read and displayed as opposed to that of BASIC.

To close we must do two things, 1) clear the channels being used and 2) close the files, of course. You will notice that I used the X register to clear the channels and the accumulator to close them. This is very important and should be done this way for a proper closing of files from machine language. The last statement is RTS which will take us back to BASIC or whatever routine we may have used to call this one.

It took all of that to do what we could have done in these few lines of BASIC.

```
10 OPEN 8,8,8,"OPENFILE.
SRC,S,R"
20 IF DX>2 THEN PRINT DS$:END
30 GET#8,A$
40 PRINT A$;
50 IF ST <> 64 GOTO 30
60 CLOSE 8
```

I have cheated a little by using the BASIC 4 way of detecting errors instead of opening the error channel and reading it although I have not used DOPEN or DLOSE statements.

If we must do all of that work in machine language just to implement these few lines of BASIC that could even be condensed into three lines, IS IT WORTH IT? If you are just going to read a file as we did the obvious answer is no, however there are a lot more things that we will want to do. These things could not possibly be done with the present speed of BASIC. Just try to do more than one or two things using I/O with BASIC simultaneously and the reason for our need for machine language will become blatantly obvious.

I believe we have covered a lot of ground and some time for it to sink in (NO PUN INTENDED) would be most appropriate. In PART TWO of this article we will get involved with two small terminal programs that will best show a device that is used for input and output. The first program will be the most straightforward in that it will allow two COMMODORE computers to converse with their full character set. The second will translate to ascii (AMERICAN STANDARD CODE FOR INFORMATION EXCHANGE) in which we will have to do a little translation on both input and output. I use a terminal program only because I feel it is a simple but meaningful way to communicate the ideas I will present. The added ability to use the examples I use is also important. If there are any questions, I will be more than happy to answer them, however I would prefer them to wait until all THREE parts are presented. This will allow time to experiment with your own programs in which you will probably find that the answers to your questions are at your own finger tips. In closing I would just like to mention that all the program listings that are included with this article were assembled using COMMODORES assembler.□

```
LINE# LOC   CODE

00001  0000
00002  0000
00003  0000
00004  0000
00005  0000
00006  0000
00007  0000
00008  0000
00009  0000
00010  0000
00011  0000
00012  0000
00013  0000
00014  0000
00015  0000
00016  0000
00017  0000
00018  0000
00019  0000
00020  0000
00021  0000
00022  0000
00023  0000
00024  0000
00025  0000
00026  0000
00027  1000
00028  1000
00029  1000
00030  1000  A0 00
00031  1002  A9 20
00032  1004  99 7A 02
00033  1007  C8
00034  1008  C0 0A
00035  100A  D0 F8
00036  100C
00037  100C
00038  100C
00039  100C  A0 00
00040  100E  A9 B9
00041  1010  20 D2 FF
00042  1013  A9 9D
00043  1015  20 D2 FF
00044  1018  98
00045  1019  48
00046  101A  20 E4 FF
00047  101D  85 0A
00048  101F  68
00049  1020  A8
00050  1021  A5 0A
00051  1023  F0 E9
00052  1025  C9 14
00053  1027  F0 2A
00054  1029  C9 0D
00055  102B  F0 25
```

```
LINE

;PUT"@0:INPUT.SRC
;++++++++++++++++++++++++++++++++++++++
;+              INPUT ROUTINE         +
;+       SAMPLE  ML. INPUT ROUTINE.   +
;+     MAY BE USED ON ALL COMMODORE   +
;+     COMPUTERS WITH THE CHANGE OF   +
;+      THE LOAD AND BUF1 ADDRESS     +
;+    TO SUIT THE INDIVIDUAL MODELS.  +
;+         BY HOWARD ROTENBERG        +
;+           TORONTO ONTARIO          +
;++++++++++++++++++++++++++++++++++++++

WRITE  = $FFD2   ;PRINT A CHARACTER
GETCHR = $FFE4   ;GET A CHARACTER
;
;       CONSTANTS
;
LASTCH = $0A          ;TEMP STORAGE FOR
                        CHARACTERS
MAXCHR = $0A          ;LIMIT OF TEN FOR INPUT
BUF1   = $027A        ;BUFFER TO STORE INPUT
                        STRING
BACK   = $9D          ;BACKSPACE
DEL    = $14          ;DELETE
SPACE  = $20          ;SPACE
CR     = $0D          ;CARRIAGE RETURN
;
       * = $1000      ;LOAD ADDRESS
;      CLEAR OUR STORAGE BUFFER
       LDY #0         ;SET INDEX
       LDA #SPACE     ;CHR TO CLEAR BUFFER
CLR    STA BUF1,Y
       INY            ;INCREMENT INDEX
       CPY #10        ;ALL POSITIONS CLEARED
       BNE CLR        ;IF NOT LOOP BACK
;
;      INPUT ROUTINE
       LDY #0
PCURS  LDA #185       ;PRINT CURSOR
       JSR WRITE      ;CHARACTER
       LDA #BACK      ;PUT CURSOR BACK
       JSR WRITE      ;OVER IT
       TYA            ;TRANSFER INDEX
       PHA            ;STORE IT
       JSR GETCHR     ;GET A CHARACTER
       STA LASTCH     ;STORE IT
       PLA            ;GET INDEX
       TAY            ;RESTORE Y INDEX
       LDA LASTCH     ;GET SAVED CHARACTER
       BEQ PCURS      ;IF NOTHING LOOP BACK
       CMP #DEL       ;IS IT THE DELETE KEY
       BEQ DELETE     ;IF SO GOTO DELETE ROUTINE
       CMP #CR        ;IS IT A CARRAIGE RETURN
       BEQ FINISH     ;IF SO THEN EXIT
```

```
LINE# LOC   CODE       LINE

00056  102D  C9 22            CMP #'"        ;A QUOTE
00057  102F  F0 DD            BEQ PCURS      ;DONT ALLOW
00058  1031  99 7A 02         STA BUF1,Y     ;STORE THE CHARACTER
00059  1034  20 D2 FF         JSR WRITE      ;AND PRINT TO THE SCREEN
00060  1037  C8               INY            ;INCREMENT BUFFER INDEX
00061  1038  C0 0A            CPY #MAXCHR    ;ALL CHARACTERS DONE
00062  103A  F0 03            BEQ WAIT       ;YES SO WAIT FOR DEL OR CR
00063  103C  4C 0E 10         JMP PCURS      ;NO? GO BACK FOR ANOTHER
00064  103F  98         WAIT  TYA            ;TRANSFER INDEX
00065  1040  48               PHA            ; SAVE IT
00066  1041  20 E4 FF         JSR GETCHR     ;GET A CHARACTER
00067  1044  85 0A            STA LASTCH     ;STORE IT
00068  1046  68               PLA            ;RESTORE INDEX
00069  1047  A8               TAY            ;IN Y REGISTER
00070  1048  A5 0A            LDA LASTCH     ;GET THE LAST CHARACTER
00071  104A  C9 14            CMP #DEL       ;IS IT A DELETE
00072  104C  F0 05            BEQ DELETE     ;YES SO BACK TO DELETE
                                               ROUTINE
00073  104E  C9 0D            CMP #CR        ;IS IT A CARRIAGE RETURN
00074  1050  D0 ED            BNE WAIT       ;NO SO GO BACK FOR ANOTHER
                                               CHR
00075  1052  60           FINISH RTS
00076  1053               ;
00077  1053               ;     DELETE A CHARACTER
00078  1053               ;
00079  1053  C0 00        DELETE CPY #00      ;ANY CHARACTERS TO DELETE
00080  1055  F0 B7               BEQ PCURS    ;NO BRANCH BACK
00081  1057  A9 9D               LDA #BACK    ;GET BACKSPACE
00082  1059  20 D2 FF            JSR WRITE    ;AND POSITION CURSOR BACK
00083  105C  A9 20               LDA #SPACE   ;GET SPACE AND
00084  105E  20 D2 FF            JSR WRITE    ;PRINT TWICE TO DELETE
00085  1061  20 D2 FF            JSR WRITE    ;CHARACTER AND CURSOR
00086  1064  A9 9D               LDA #BACK    ;GET BACKSPACE
00087  1066  20 D2 FF            JSR WRITE    ;POSITION BACK
00088  1069  20 D2 FF            JSR WRITE    ;OVER DELETED CHARACTER
00089  106C  88                  DEY          ;DECREMENT BUFFER INDEX
00090  106D  4C 0E 10            JMP PCURS    ;BACK FOR ANOTHER
00091  1070                      .END           CHARACTER
```

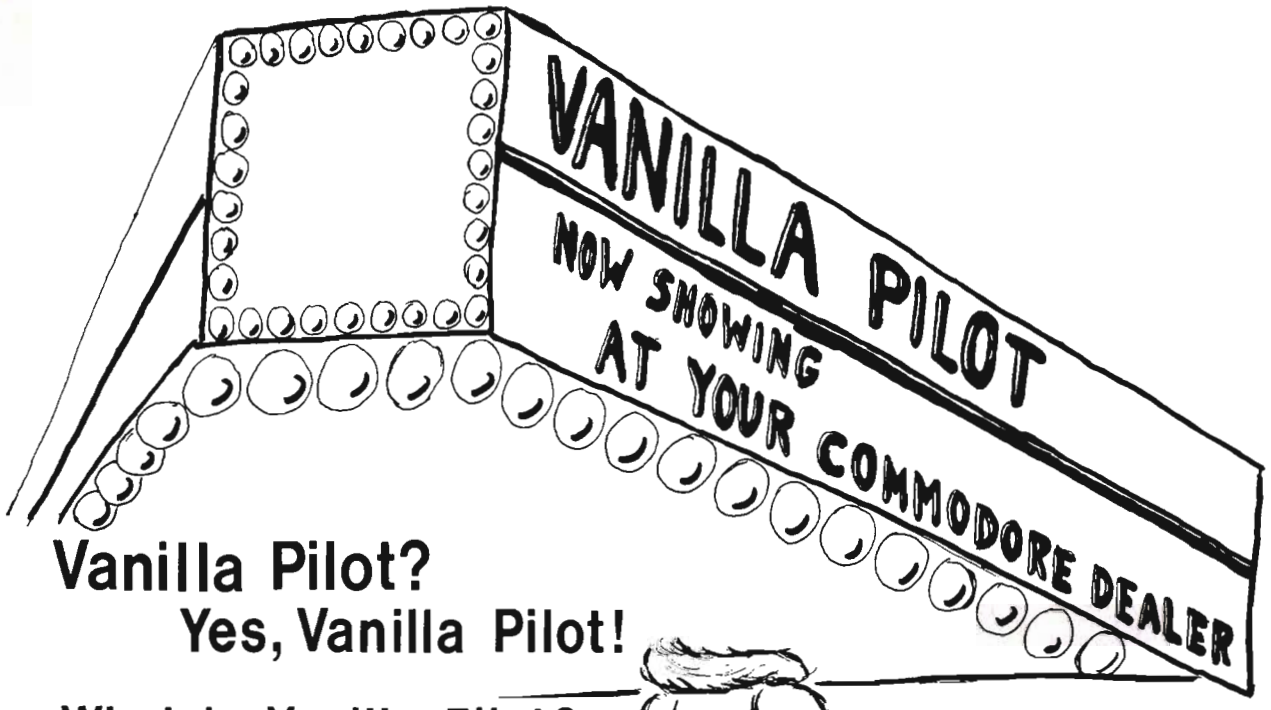
```
ERRORS = 00000


SYMBOL TABLE

SYMBOL VALUE
 BACK     009D    BUF1     027A    CLR      1004    CR       000D
 DEL      0014    DELETE   1053    FINISH   1052    GETCHR   FFE4
 LASTCH   000A    MAXCHR   000A    PCURS    100E    SPACE    0020
 WAIT     103F    WRITE    FFD2

END OF ASSEMBLY
```

Continued on page 20



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```
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```

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```
BACK    $009D     21     42     81     86
BUF1    $027A     20     32     58
CLR     $1004     32     35
CR      $000D     24     54     73
DEL     $0014     22     52     71
DELETE  $1053     53     72     79
FINISH  $1052     55     75
GETCHR  $FFE4     14     46     66
LASTCH  $000A     18     47     50     67     70
MAXCHR  $000A     19     61
PCURS   $100E     40     51     57     63     80     90
SPACE   $0020     23     31     83
WAIT    $103F     62     64     74
WRITE   $FFD2     13     41     43     59     82     84     85     87     88
```


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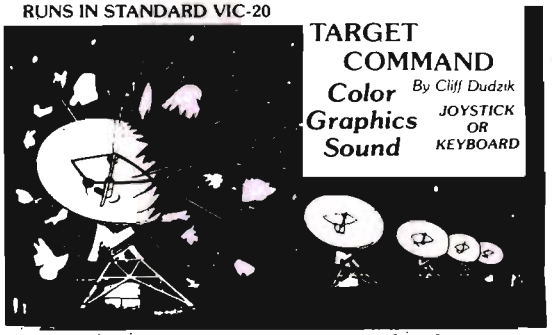

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```
LINE# LOC    CODE          LINE

00001  0000              ;PUT"@0:OPENFILE.SRC"
00002  0000              ;+++++++++++++++++++++++++++++++++++++
00003  0000              ;+      OPEN FILE ON DISK FOR INPUT    +
00004  0000              ;+       FROM ML. SAMPLE PRGRAM # 2    +
00005  0000              ;+           BY HOWARD ROTENBERG       +
00006  0000              ;+             TORONTO ONTARIO         +
00007  0000              ;+++++++++++++++++++++++++++++++++++++
00008  0000              ;
00009  0000              FNUM    = $D2       ;HOLDS FILE NUMBER
00010  0000              FNLEN   = $D1       ;HOLDS FILE NAME LENGTH
00011  0000              FNPTR   = $DA       ;FILE NAME POINTER
00012  0000              OPEN    = $F563     ;OPEN FILE  2.0 = $F524
00013  0000              OPENI   = $F7AF     ;OPEN FOR INPUT 2.0 = $F770
00014  0000              DISKDS  = $FFBD     ;GET DS$ DISK STATUS
00015  0000              CLOSE   = $F2E2     ;CLOSE FILE 2.0 = $F2AE
00016  0000              CLEAR   = $F2A6     ;CLEAR CHANNEL 2.0 = $F284?
00017  0000              GETCHR  = $FFE4     ;GET A CHARACTER
00018  0000              WRITE   = $FFD2     ;WRITE CHARACTER
00019  0000              TEMP    = $634      ;TEMP STORAGE FOR FILE LENGTH
00020  0000              DEV     = $D4       ;DEVICE NUMBER
00021  0000              SECADR  = $D3       ;SECONDARY ADDRESS
00022  0000              STATUS  = $96       ;STATUS ST
00023  0000              DISKER  = $3F       ;FLAG FOR DISK ERROR
00024  0000              PRMSG   = $BB1D     ;PRINT MESSAGE, 2.0 = $CA1C
00025  0000              ;
00026  0000                      * = $1000   ;LOAD ADDRESS
00027  1000              ;
00028  1000              ;       OPEN COMMAND CHANNEL
00029  1000              ;
00030  1000  A9 0F               LDA #$0F    ;GET FILE NUMBER
00031  1002  85 D2               STA FNUM    ;AND STORE IT
00032  1004  A9 08               LDA #8      ;GET DEVICE NUMBER
00033  1006  85 D4               STA DEV     ;AND STORE IT
00034  1008  A9 0F               LDA #$0F    ;GET SECONDARY
00035  100A  09 60               ORA #$60    ;ADDRESS
00036  100C  85 D3               STA SECADR  ;AND STORE IT
00037  100E  A9 00               LDA #0      ;SET THE FILE
00038  1010  85 D1               STA FNLEN   ;LENGTH TO 0
00039  1012  85 96               STA STATUS  ;AND STATUS TO 0
00040  1014  20 63 F5            JSR OPEN    ;OPEN CHANNEL
00041  1017              ;
00042  1017              ;      GET FILE NAME LENGTH
00043  1017              ;
00044  1017  A2 00               LDX #0      ;SET INDEX
00045  1019  BD 8D 10 GETLEN     LDA FILE,X  ;GET CHARACTER IN NAME
00046  101C  F0 03               BEQ GOTIT   ;IF LAST CHARACTER THEN GET OUT
00047  101E  E8                  INX         ;INCREMENT COUNTER FOR NEXT CHR
00048  101F  D0 F8               BNE GETLEN  ;BRANCH ALWAY'S FOR NEXT CHR
00049  1021              ;
00050  1021              ;       GET FILE NAME AND OPEN
00051  1021              ;
00052  1021  8E 34 06 GOTIT      STX TEMP    ;SAVE FILE LENGTH
00053  1024  A9 08               LDA #8      ;GET FILE NUMBER
00054  1026  85 D2               STA FNUM    ;STORE FILE NUMBER
00055  1028  85 D4               STA DEV     ;STORE DEV
```

```
LINE# LOC   CODE          LINE

00056  102A  09 60          ORA #$60      ;8,8,8
00057  102C  85 D3          STA SECADR    ;STORE SECONDARY ADDRESS
00058  102E  AD 34 06       LDA TEMP      ;GET FILE  LENGTH
00059  1031  85 D1          STA FNLEN     ;STORE IT
00060  1033  A9 8D          LDA #<FILE    ;GET LOW BYTE
00061  1035  85 DA          STA FNPTR     ;STORE AT FILENAME POINTER
00062  1037  A9 10          LDA #>FILE    ;GET HIGH BYTE
00063  1039  85 DB          STA FNPTR+1   ;AND STORE IT
00064  103B  A9 00          LDA #0
00065  103D  85 96          STA STATUS    ;SET STATUS TO 0
00066  103F  20 63 F5       JSR OPEN      ;OPEN FILE
00067  1042  20 75 10       JSR ERRCHK    ;CHECK FOR DISK ERROR
00068  1045  A2 08          LDX #8        ;GET FILE NUMBER
00069  1047  20 AF F7       JSR OPENI     ;OPEN DEVICE FOR INPUT
00070  104A  A5 3F          LDA DISKER    ;CHECK ERROR FLAG
00071  104C  C9 01          CMP #1        ;IF SET THEN
00072  104E  F0 0C          BEQ FINISH    ;CLOSE FILES AND GET OUT
00073  1050                ;
00074  1050                ;          READ AND DISPLAY FILE
00075  1050                ;
00076  1050  20 E4 FF    DISPLY JSR GETCHR    ;GET A CHARACTER
00077  1053  20 D2 FF       JSR WRITE     ;WRITE A CHARACTER
00078  1056  A6 96          LDX STATUS    ;GET ST
00079  1058  D0 02          BNE FINISH    ;IF SET THEN CLOSE FILES
00080  105A  F0 F4          BEQ DISPLY    ;BACK FOR ANOTHER CHARACTER
00081  105C                ;
00082  105C                ;            CLOSE FILES AND RETURN TO BASIC
00083  105C                ;
00084  105C  A2 08       FINISH LDX #8         ;GET FILE NUMBER
00085  105E  20 A6 F2       JSR CLEAR     ;CLEAR CHANNEL
30086  1061  A9 08          LDA #8        ;GET FILE NUMBER
00087  1063  20 E2 F2       JSR CLOSE     ;CLOSE FILE
00088  1066  A2 0F          LDX #15       ;GET FILE NUMBER
00089  1068  20 A6 F2       JSR CLEAR     ;CLEAR CHANNEL
00090  106B  A9 0F          LDA #15       ;GET FILE NUMBER
00091  106D  20 E2 F2       JSR CLOSE     ;CLOSE FILE
00092  .070  A9 00          LDA #0        ;RESET DISK ERROR
00093  1072  85 3F          STA DISKER    ;TO ZERO
00094  1074  60             RTS           ;BACK TO BASIC
00095  1075                ;
00096  1075                ;          DISK ERROR ROUTINE
00097  1075                ;
00098  1075  20 BD FF    ERRCHK JSR DISKDS    ;GET DS$
00099  1078  A0 00          LDY #0        ;GET FIRST CHARATER
00100  107A  B1 0E          LDA ($0E),Y   ;AND COMPARE IT
00101  107C  C9 32          CMP #$32      ;IF GREATER THAN 2
00102  107E  B0 01          BCS PERROR    ;THEN ERROR OCCURED
00103  1080  60             RTS           ;RETURN TO CALLER
00104  1081  A9 A0       PERROR LDA #<PRTERR ;GET LOW BYTE OF ERROR MSG
00105  1083  A0 10          LDY #>PRTERR  ;GET HIGH BYTE
00106  1085  20 1D BB       JSR PRMSG     ;PRINT ERROR MSG
00107  1088  A2 01          LDX #1        ;GET NUMBER FOR FLAG
00108  108A  86 3F          STX DISKER    ;AND STORE IT
00109  108C  60             RTS           ;BACK TO CALLER
00110  108D                ;
```

```
LINE# LOC    CODE          LINE

00111  108D                ;            TABLES
00112  108D                ;
00113  108D  30 3A         FILE    .BYTE '0:OPENFILE.SRC,S,R',0
00113  109F  00
00114  10A0  2A 2A         PRTERR .BYTE '*** DISK ERROR ***',0
00114  10B2  00
00115  10B3                       .END


ERRORS = 00000


SYMBOL TABLE

SYMBOL VALUE
 CLEAR    F2A6    CLOSE    F2E2    DEV      00D4    DISKDS   FFBD
 DISKER   003F    DISPLY   1050    ERRCHK   1075    FILE     108D
 FINISH   105C    FNLEN    00D1    FNPTR    00DA    FNUM     00D2
 GETCHR   FFE4    GETLEN   1019    GOTIT    1021    OPEN     F563
 OPENI    F7AF    PERROR   1081    PRMSG    BB1D    PRTERR   10A0
 SECADR   00D3    STATUS   0096    TEMP     0634    WRITE    FFD2


END OF ASSEMBLY



CROSS REFERENCE......PAGE    1


  CLEAR  $F2A6    16    85    89
  CLOSE  $F2E2    15    87    91
  DEV    $00D4    20    33    55
  DISKDS $FFBD    14    98
  DISKER $003F    23    70    93   108
  DISPLY $1050    76    80
  ERRCHK $1075    67    98
  FILE   $108D    45    60    62   113
  FINISH $105C    72    79    84
  FNLEN  $00D1    10    38    59
  FNPTR  $00DA    11    61    63
  FNUM   $00D2     9    31    54
  GETCHR $FFE4    17    76
  GETLEN $1019    45    48
  GOTIT  $1021    46    52
  OPEN   $F563    12    40    66
  OPENI  $F7AF    13    69
  PERROR $1081   102   104
  PRMSG  $BB1D    24   106
  PRTERR $10A0   104   105   114
  SECADR $00D3    21    36    57
  STATUS $0096    22    39    65    78
  TEMP   $0634    19    52    58
  WRITE  $FFD2    18    77
```

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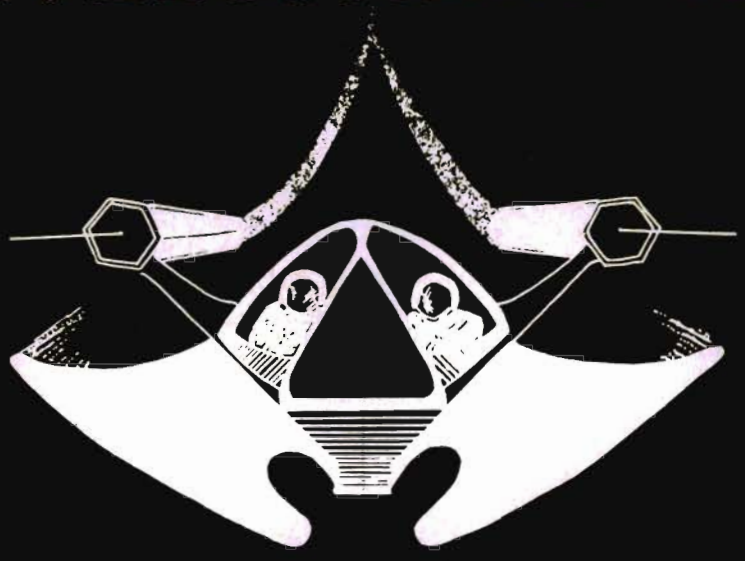

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An Introduction to Assembly Language Programming on the VIC-20— Part IV: Loading and Storing Registers

by Eric Giguere
Alberta, Canada

During the last three months we've learned a lot—all about what assembly language is, about monitors and assemblers, and about the 6502's registers and addressing modes. By now you must be itching to start some actual programming, and so I'm here to relieve that itch. This month we do some real, albeit elementary, programming in assembly language, all the while learning how to load and store registers. I'll be providing some examples along with the text, and these can be typed in using a monitor (which one you get doesn't matter). Along with the examples will also be some suggested changes for the PET/CBM and the Commodore 64, just so that those of you with either machine won't feel left out, OK? If everybody is ready; then we can start.

Loading the Registers

When we say that we are **loading** a register, what we are doing is placing a value from 0 to 255 in that register. It's sort of like assigning a value to a variable in BASIC, only a bit more complex. We have to specify the register we want, and the way the value to be loaded is to be found (the addressing mode). Thus the opcode (short for **operation code**—a fancy name for **instruction** or **command**) for loading a register is as follows:

LDn (data)

where **n** is the register you are referring to and **(data)** is the addressing mode you want. The registers used by this statement can be either the Accumulator, the X-register, or the Y-register, indicated in the instruction by using A,X or Y (respectively) in the place of **n**. Consequently, the instruction

LDA (data)

will load the **accumulator** with the specified data, while

LDX (data)

will load the **X-register.** This also applies to LDY, which will load the **Y-register.** Generally any instruction that ends with A, X or Y affects the accumulator, X-register, or Y-register, respectively.

Specifying the Addressing Mode

It is of little use to know how to code an instruction if you can't use it. To be able to do so, you have to specify the **addressing mode.** If you recall from last month's column, the addressing mode tells the microprocessor how it is supposed to find the data it needs to perform its operation. You can tell the chip to load the accumulator, but it has to know what or where to load it with or from. Because there is a large number of addressing modes that can be used, how the computer loads a register depends on how you specify an addressing mode. If you wanted to load the accumulator with the byte found at $00, you would code:

LDA $00

which tells the microprocessor to place the value it finds in byte $00 into the accumulator. It is analogous to saying

A = PEEK(Ø)

in BASIC, which would give the variable A the value of location Ø. Of course, you can use other addressing modes with the instruction. For example, the following loads the X-register with $20 hex (32 decimal):

LDX #$20

The pound sign preceding the hex number is a signal to the chip that the value following is to be stored straight into the register, and to not be interpreted as an address to load data from. This is known as **immediate mode** because it uses the byte immediately following the instruction.

If you are hand assembling your assembly language code (that is, you aren't using an assembler), you have to manually translate the opcodes into the proper numbers which you can then enter into the computer using a monitor. Unless you've got every code memorized, you'll need some sort of reference manual to help you, as each addressing mode of each opcode has a different value, and it gets pretty hairy after a while if you try and remember them all. So I suggest that you get yourself some kind of reference guide that lists all the opcodes and their respective values. One such book is the VIC-20 Programmer's Reference Guide, which has a section on assembly language and a table listing all the opcodes and their hexadecimal equivalents. Thus, using such a guide, you can take the following:

```
LDA #$08
STA $00
RTS
```

and change it to

```
A9 08 (values given in hex)
85 00
60
```

and then enter it into the computer using the monitor .M function. It may sound like a lot of work, and it is. Fortunately, if you have the VICMON Machine Language Cartridge, you can use the .A command to type in your code in mnemonic form, and it will automatically decode it for you and place the appropriate bytes directly into memory, which saves you the trouble of converting them manually. But because most VIC owners don't have VICMON or an assembler, I am presenting all examples in monitor form, all decoded and ready to type in. You won't have to worry about translating the opcodes into their correct forms.

Examples of Loading the Registers

Following is a simple assembly language routine, followed itself by the proper bytes you need to type in. First load and enter your monitor (using the instructions that came with it). Then type in

```
.M Ø33C Ø342
```

which will display on the screen the values contained in the bytes from $033C to $0342, like this:

```
.:033C 00 00 00 00 00
.:0341 00 00 00 00 00
```

Don't worry if the numbers aren't the

same. Simply move the cursor over to the first Ø after .:033C and type in the five numbers that follow the mnemonic listing, and hit RETURN. The cursor will then be on the first Ø after .:0341, and you will then type in the following two bytes and hit RETURN. (The rest of the line can be ignored.) Voila! You've just entered your first assembly language program, and are now ready to test it.

```
LDA #$ØØ
LDX #$ØØ
LDY #$ØØ
BRK
  A9 00 A2 00 A0
  00 00
```

First, though, we've got to make sure the program is in fact still there. Type in .M Ø33C Ø342 and hit RETURN. The following should appear:

.:033C A9 00 A2 00 A0

.:0341 00 00 xx xx xx (xx signifies the byte can be ignored)

If it doesn't, then repeat the process of entering in the numbers, and then test to see if they are in fact there once more.

Now that everything is ready, we can try our program. First, type in .R and hit RETURN. This is the Register display command, which causes the present values of the registers to be displayed on the screen. The ones we are concerned with are AC (accumulator), XR (X-register) and YR (Y-register). Note their values (the bytes displayed directly underneath the abbreviations), and then key in

.GØ33C (RETURN)

Presto! The computer returns and redisplays the registers, which should look like this:

```
B*
   PC SR AC XR YR SP
.;0342 xx 00 00 00 xx
```

(again, xx is to be ignored). As you can see, you have changed the values for the accumulator and the X- and Y-registers. They are now Ø. And although this doesn't prove very much, it does show you how the LDn command does in fact change the values in the registers. Now let's go through each step of the program, to see exactly what it does:

LDA #$00—This loads the accumulator with zero ($00)

LDX #$00—This loads the X-register with zero

LDY #$00—This loads the Y-register with zero

BRK—This is a special instruction to tell the computer to BReaK off from what it is doing and return to monitor.

As you can see, all we really did was load the three registers with zero and then stopped by using the BRK instruction. We could have just as easily loaded different values, such as $3F or $8C, but I just wanted to use a number with no particular significance to demonstrate what I was getting at.

Storing Registers

So far, all we can do is load the three registers, and not much else. But what if we could store the values in the registers in memory? Couldn't it just work like a POKE from BASIC? Yes, it could and does. The command to store a register is:

STn (data)

where once more **n** is the register desired and **(data)** is the memory location it is to be stored in. The opcode

STA $00

would store the **present value** of the accumulator into the address $00, just as if you had said POKEØ,A from BASIC, where A equals a value from Ø to 255. This is a very useful command, then, because you can now load a register with a specific value and then store it where you want. Consider the following short program:

```
LDA #$01
STA $1E00
BRK
```

First it will load the accumulator with a value of one, and then it will proceed to store it at location $1EØØ, which is the start of screen memory on the VIC. It's as if you had said

A = 1:POKE7680,A

from BASIC, and does the exact same thing, only hundreds of times faster. Here is the monitor listing:

```
.:033C A9 01 8D 00 1E
.:0341 00 xx xx xx xx        (for VIC)

.:033C A9 01 8D 00 04
.:0341 00 xx xx xx xx
                  (for Commodore 64)

.:033C A9 01 8D 00 80
.:0341 00 xx xx xx xx(for PET/CBM)
```

Once again, type .M Ø33C Ø341 (RETURN) and then cursor over to the first byte displayed after .:Ø33C. Then proceed to type in the bytes as shown for each machine and hit RETURN when you are at the end of the line (those with the Commodore 64 and PET/CBM have a monitor which probably displays more than five bytes per line, in which case you can type in the sixth byte in the monitor listings directly after the fifth, and then hit RETURN. It amounts to the same thing.) The program is now in memory. The different listings are required for each machine because screen memory starts at a different location—$1E00 for the VIC, $0400 for the Commodore 64, and $8000 for the PET/CBM. Note that when typed in, the addresses after the STA instruction ($8D) are entered in reverse—as 00 1E instead of 1E 00. This is because the low part (least significant) byte (in this case ØØ) must precede the high part (most significant) of the address, in this case 1E. This is required whenever you store an address in memory, and should be remembered. The VICMON assembler does this automatically, as will any assembler. If forgotten, though, it can lead to trouble!

When you have finished entering the program, you can then execute it using the .G (goto) command. Type:

.GØ33C (RETURN)

This will start the computer to execute the program it finds at 033C, which is our little program. Quick as a flash, our code is executed and command returned to the monitor when the BRK instruction encountered. The result? An 'A' should have appeared in the top left-hand corner of the screen, and the registers displayed. If there isn't an 'A', then perhaps the screen scrolled and the 'A' was wisked away to Never-never Land. Cursor back up to the .G command again and hit RETURN. The 'A' should appear. If not, then perhaps you typed something wrong, and you should check to see if that is the problem. If you still can't figure out what's wrong, then drop me a line and I'll try and locate your problem.

More Useful Things To Do

As you have seen, STn can act just like a POKE. The thing is, this can be used for a variety of applications. You can set memory locations to whatever you want, and thus can control certain aspects of the computer, such as the screen color, top of memory, etc. You can use the instruction to store a value for later retrieval by your program (using the LDn command). Most machine and assembly language programs use LDn and STn in some form or another if it wants to do someting noticeable. In fact, I've yet to see a program that doesn't use one of these.

A Cute Program

Before leaving, I'm presenting the VIC owners with a small machine language program, with the monitor and assembly listings. It doesn't do that much, but it does show what LDn and STn can be used for. Try and figure what it does before executing it.

```
.:033c a9 08 8d Of 90
.:0341 a9 08 8d 00 1e
.:0346 a9 09 8d 01 1e
.:034b a9 20 8d 02 1e
.:0350 a9 14 8d 03 1e
.:0355 a9 08 8d 04 1e
.:035a a9 05 8d 05 1e
.:035f a9 12 8d 06 1e
.:0364 a9 05 8d 07 1e
.:0369 a9 21 8d 08 1e
.:036e 00 xx xx xx xx
```

```
lda #$08          lda #$05
sta $900f         sta $1e05
lda #$08          lda #$12
sta $1e00         sta $1e06
lda #$09          lda #$05
sta $1e01         sta $1e07
lda #$20          lda #$21
sta $1e02         sta $1e08
lda #$14          brk
sta $1e03
lda #$08
sta $1e04
```

(Use .G Ø33C to activate.)

Next Month . . .

Next month we continue our exploration of assembly language by talking about **branches and comparisons**. So, until next month, keep on assembling!□

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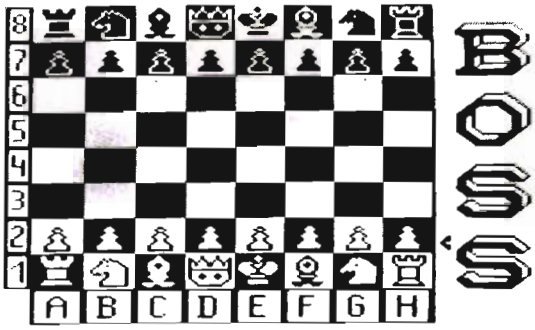

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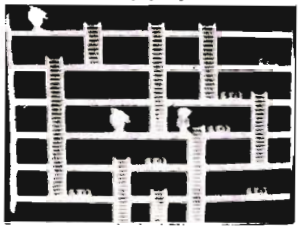

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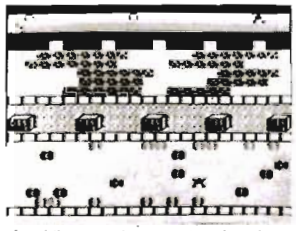

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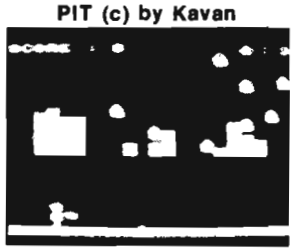

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Solitaire Four

by Edwin Sund
Tacoma, WA

Solitaire Four, is a version of that all time favorite single-player card game. This implementation will run on the Pet, 64 and Vic (with changes) and uses no fancy short-cut or time saving coding techniques. My intent in writing this game was to get my wife interested in my computer and maybe even into writing her own programs. Some people do not enjoy shoot-em-up type games which made up the majority of games available 5 years ago and my wife falls directly into this category. With that in mind and knowing that she likes solitaire, the first step to ease her onto my computer was to give her a program she could both relate to and enjoy. The second step, (I hoped), was to show her how a complex program could be written using simple basic instructions. As it turns out, in the last 5 years of playing Solitaire on the computer, step one was a big success because she plays it all the time, step two was a dismal failure because she didn't care how it worked.

The program listing provided uses some standard conventions for printing graphic characters on a non-graphics printer. The symbols [ ] mean that a cursor control key, function key or graphics key will be represented within the brackets. In addition to cursor control keys this program contains 8 different graphic keys which are the four cursor characters and right,left, top and bottom bar characters. I have represented them in the listing as [COMDR T] to designate holding the commodore logo key down and typing the T character, or [shift P] to designate holding the shift down and typing a P. There is nothing fancy about this program as it is neither efficient nor structured. The inefficiency part was intentional as it allows inexperienced people to understand the program easier.

Following is a brief explanation of the rules for Solitaire Four and a description of the variables and their use. I have also included the modifications to allow VIC-20 users, (no, I didn't forget you VIC people), to use this program. Enjoy the program and if you don't want to key the program in, send $6 or a self addressed stamped mailer and cassette plus $1 to:

Solitiare game
c/o Ed Sund
7101 Topaz Dr. SW.
Tacoma, Washington 98498

Rules for Solitaire Four

Layout:

1. Shuffle a deck of 52 cards.
2. Deal out 11 cards face down and turn the top one face up. This is the replacement pile.
3. Deal out 4 cards in a row face up next to the replacement pile. This is the playing stacks.
4. Deal out 1 more card face up above one of the play stacks. This is the win row.
5. Place the remaining 36 cards face down as a draw pile.

Object

To build four stacks of cards of the same suit in ascending sequence. Score is kept by deducting 52 points for each game and adding 5 points for each card added to a win stack.

The play

Cards are taken 3 at a time and turned face up in a pile. The top card of the draw pile may be placed on any play stack in descending sequence alternating colors. The top replacement stack card may also be used in the same manner. A complete play stack may be played on another play stack the resulting hole being replaced from the replacement stack (if empty from the top of draw pile). The top card from any stack or pile may be placed on a win stack of the same suit in ascending order. Note: The first card of all win stacks are the same number as the card dealt in step 4 of layout.

Computer Play

To play a card enter the denomination (A,2-9, T, J, Q or K) followed by a suit designation (use keys with card symbols) and the computer will figure out where to put it for you. If the move was invalid it will flash "INV" where it said "MOVE" and you must try again. To turn over the next 3 on the draw pile enter "N". If you just saw a move after you hit the "N" then enter "B" and it will go back to the last draw card for you (caution: it only goes back 1 set of three) and you can then make your play. To restart the game enter "E" and it will automatically deduct 52 points from your score and start over.

Modifications for the Vic-20

Lines 690-930 display the cards on the screen. These lines must be modified to change a 40 column display to a 22 column display. The modified code is as follows:

★ Caution ★

It is difficult to tell the difference between O's and zeroes in the Solitaire Four listing. A simple guide to use is: **No variable names will contain the letter O; no Basic commands (GOTO, FOR, etc.) will contain a zero. No numbers will contain the letter O.**

Modifications for the VIC-20

```
810 IFA>10THENA=10
820 PRINT:PRINT:PRINT:IFA=2THEN840
830FORX=3TOA:PRINT:PRINT:NEXTX
840IFC=0THEN940
850CC$=MID$(C$,3,1):IFCC$="[CLUB]"ORCC$="[SPADE]"THEN900
860PRINTTAB((B*4)-4)"[SHIFT O][COMDR T][COMDR T][SHIFT P]";
870PRINT"[DOWN][4 LEFT][COMDR G]"MID$(C$,2,2);"COMDR M]";
880 PRINT"[DOWN][4 LEFT][SHIFT L][COMDR @][COMDR @][SHIFT @]"
890 RETURN
900 PRINTTAB((B*4)-4)"[RVS]     [DOWN][4 LEFT] ";
910 PRINTMID$(C$,2,2)" ";
920PRINT"[DOWN][4 LEFT]     [OFF]";
930 RETURN
940 IFA=2THENPRINTTAB((B*4)-4)"     [UP]"
950 PRINTTAB((B*4)-4)"[DOWN]     ";
960 PRINT"[DOWN][4 LEFT]     ";

1800 IFDR(10)=1THENB=1:A=10:C=D(I):GOSUB680
1810 PRINT"[HOME][22 DOWN]          [RVS]SCORE ";SC+((W1+W2+W3
+W4)*5);"[O FF]";

280 PRINT"[HOME]MOVE[15 RIGHT]";U1$;
```

Variable useage:

Arrays

```
D(52)   =   DRAW PILE
T(52)   =   CARD IS TAKEN IF = 0
R1(13)  =   PLAY STACK ROW 1
R2(13)  =   PLAY STACK ROW 2
R3(13)  =   PLAY STACK ROW 3
R4(13)  =   PLAY STACK ROW 4
W1(13)  =   WIN  STACK ROW 1
W2(13)  =   WIN  STACK ROW 2
W3(13)  =   WIN  STACK ROW 3
W4(13)  =   WIN  STACK ROW 4
P(11)   =   REPLACEMENT STACK
DR(10)  =   WHICH ROW(S) TO REDRAW
```

OTHER VARIABLES

```
SC  =  SCORE
U   =  SUIT VALUE OF FIRST CARD ON WIN STACK
FM  =  WHICH STACK CARD(S) ARE BEING TAKEN FROM
T1  =  WHICH STACK CARD(S) ARE GOING TO
ER  =  INDICATES THAT THIS CARD CAN'T BE MOVED
```

Solitaire Four

```
10 I=RND(-TI):DIMDR(10)
20 DIMD(52),T(52),P(11),R1(13),R2(13),R3
(13),R4(13),W1(13),W2(13),W3(13),W4(13)
30 SC=SC-57:PRINT"[CLEAR]":FORI=1TO52
40 T(I)=0:NEXT:FORI=1TO52
50 C=INT(RND(1+TI)*53):IFC=0GOTO50
60 IFT(C)=1GOTO50
70 T(C)=1:D(I)=C:NEXT
80 FORI=1TO11:P(I)=D(I):T(D(I))=0:NEXTI:J=11
```

```
90 R1(1)=D(12):T(D(12))=0:R1=1:W1=1
100 R2(1)=D(13):T(D(13))=0:R2=1:W2=0
110 R3(1)=D(14):T(D(14))=0:R3=1:W3=0
120 R4(1)=D(15):T(D(15))=0:R4=1:W4=0
130 W1(1)=D(16):T(D(16))=0:U=D(16)
140 DR(1)=1:DR(2)=1:DR(3)=1:DR(4)=1:DR(9
)=1:DR(5)=1
150 IFU>13THENU=U-13:GOTO150
160 U1$=STR$(U)
170 IFU=10THENU1$="T"
180 IFU=11THENU1$="J"
190 IFU=12THENU1$="Q"
200 IFU=13THENU1$="K"
210 IFU=1THENU1$="A"
220 T=0:FORI=17TO52:IFT(D(I))=1THENT=T+1
:L=I:IFT=3THENT=0:LS=LN:LN=I:GOTO270
230 NEXTI:IFT<>0THENI=L:T=4:GOTO270
240 FORI=17TO52:IFT(I)<>0THEN220
250 NEXTI:I=0
260 GOTO220
270 DR(10)=1:GOSUB1710
280 PRINT"[HOME]MOVE?[25 RIGHT]";U1$
290 GETE$:IFE$=""GOTO290
300 IFE$="N"ANDLL=1THENLL=0:GOTO220
310 IFE$="N"GOTO640
320 IFE$="B"THENI=LS:GOTO270
330 IFE$="E"THEN660
340 IFE$="T"THENE=10:GOTO410
350 IFE$="J"THENE=11:GOTO410
360 IFE$="Q"THENE=12:GOTO410
370 IFE$="K"THENE=13:GOTO410
380 IFE$="A"THENE=1:GOTO410
390 IFE$="D"THENFORZZ=1TO10:DR(ZZ)=1:NEX
TZZ:PRINT"[CLEAR]":GOSUB1710:GOTO280
400 E=VAL(E$):IFE=0THEN290
410 PRINT"[HOME][DOWN]"E$;
420 GETE$:IFE$=""GOTO420
430 IFE$="S"THENE$="[HEART]":S=0:GOTO480
440 IFE$="Z"THENE$="[DIAMOND]":S=13:GOTO
480
450 IFE$="X"THENE$="[CLUB]":S=26:GOTO480
460 IFE$="A"THENE$="[SPADE]":S=39:GOTO48
0
470 GOTO420
480 PRINT"[HOME][DOWN][RIGHT]"E$
490 S=S+E:GOSUB980:IFER=1THEN280
500 GOSUB1250:IFER=1THENGOSUB1080:GOTO28
0
510 DR(T1)=1:IFT1>4THEN570
520 IFFM=1THENFORZ=1TOR1:XX=R1(Z):GOSUB1
590:NEXTZ:R1=0:DR(1)=1
530 IFFM=2THENFORZ=1TOR2:XX=R2(Z):GOSUB1
590:NEXTZ:R2=0:DR(2)=1
540 IFFM=3THENFORZ=1TOR3:XX=R3(Z):GOSUB1
590:NEXTZ:R3=0:DR(3)=1
550 IFFM=4THENFORZ=1TOR4:XX=R4(Z):GOSUB1
590:NEXTZ:R4=0:DR(4)=1
```


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```
560 GOTO610
570 IFFM=1THENXX=R1(R1):R1=R1-1:GOSUB159
0:DR(1)=1
580 IFFM=2THENXX=R2(R2):R2=R2-1:GOSUB159
0:DR(2)=1
590 IFFM=3THENXX=R3(R3):R3=R3-1:GOSUB159
0:DR(3)=1
600 IFFM=4THENXX=R4(R4):R4=R4-1:GOSUB159
0:DR(4)=1
610 IFFM=5THENXX=P(J):J=J-1:GOSUB1590:DR
(9)=1
620 IFFM=6THENXX=D(I):T(D(I))=0:GOSUB159
0:DR(10)=1
630 GOTO1110
640 IFT=4THEN220
650 GOTO230
660 SC=SC+((W1+W2+W3+W4)*5):GOTO30
670 REM SCREEN DISPLAY ROUTINE
680 REM PRINTS ONE CARD
690 IFC<14THENC$="[HEART]"
700 IFC>13ANDC<27THENC$="[DIAMOND]"
710 IFC>26ANDC<40THENC$="[CLUB]"
720 IFC>39THENC$="[SPADE]"
730 IFC>13THENC=C-13:GOTO730
740 IFC=13THENC$=" K"+C$:GOTO795
750 IFC=1 THENC$=" A"+C$:GOTO795
760 IFC=12THENC$=" Q"+C$:GOTO795
770 IFC=11THENC$=" J"+C$:GOTO795
780 IFC=10THENC$=" T"+C$:GOTO795
790 C$=STR$(C)+C$
795 PRINT"[HOME]";
800 IFA=1THEN840
810 IFA>11THENA=11
820 PRINT:PRINT:PRINT:IFA=2THEN840
830 FORX=3TOA:PRINT:PRINT:NEXTX
840 IFC=0THEN940
850 CC$=MID$(C$,3,1):IFCC$="[CLUB]"ORCC$
="[SPADE]"THEN900
860 PRINTTAB((B*6)-6)"[SHIFT O][COMDR Y]
[COMDR Y][COMDRY][SHIFT P]";
870 PRINT"[DOWN][5 LEFT][COMDR G]";MID$(
C$,2,2);" [COMDR M]";
880 PRINT"[DOWN][5 LEFT][SHIFT L][COMDR
P][COMDR P][COMDR P][SHIFT @]"
890 RETURN
900 PRINTTAB((B*6)-6)"[RVS]     [DOWN][5
 LEFT][RVS] ";
910 PRINTMID$(C$,2,2);"  ";
920 PRINT"[DOWN][5 LEFT][RVS]     [OFF]"
930 RETURN
940 IFA=2THENPRINTTAB((B*6)-6)"     [UP]
"
950 PRINTTAB((B*6)-6)"[DOWN]     ";
960 PRINT"[DOWN][5 LEFT]     "
970 RETURN
980 IFR1(1)=STHENFM=1:GOTO1100
990 IFR2(1)=STHENFM=2:GOTO1100
```

```
1000 IFR3(1)=STHENFM=3:GOTO1100
1010 IFR4(1)=STHENFM=4:GOTO1100
1020 IFR1(R1)=STHENFM=1:GOTO1100
1030 IFR2(R2)=STHENFM=2:GOTO1100
1040 IFR3(R3)=STHENFM=3:GOTO1100
1050 IFR4(R4)=STHENFM=4:GOTO1100
1060 IFP(J)=STHENFM=5:GOTO1100
1070 IFD(I)=STHENFM=6:GOTO1100
1080 PRINT"[HOME]INV!"
1090 ER=1:FORZZ=1TO1000:NEXTZZ:RETURN
1100 ER=0:RETURN
1110 IFJ=0THEN1160
1120 IFR1=0THENR1=R1+1:R1(R1)=P(J):J=J-1
:DR(9)=1:DR(1)=1
1130 IFR2=0THENR2=R2+1:R2(R2)=P(J):J=J-1
:DR(9)=1:DR(2)=1
1140 IFR3=0THENR3=R3+1:R3(R3)=P(J):J=J-1
:DR(9)=1:DR(3)=1
1150 IFR4=0THENR4=R4+1:R4(R4)=P(J):J=J-1
:DR(9)=1:DR(4)=1
1160 IFJ=0ANDR1=0ANDT(D(I))=1THENR1=1:R1
(1)=D(I):T(D(I))=0:FM=6
1170 IFJ=0ANDR2=0ANDT(D(I))=1THENR2=1:R2
(1)=D(I):T(D(I))=0:FM=6
1180 IFJ=0ANDR3=0ANDT(D(I))=1THENR3=1:R3
(1)=D(I):T(D(I))=0:FM=6
1190 IFJ=0ANDR4=0ANDT(D(I))=1THENR4=1:R4
(1)=D(I):T(D(I))=0:FM=6
1200 IFFM<>6THEN1240
1210 DR(10)=1:I=I-1:IFT(D(I))=1THENLS=I:
LN=LS:GOTO1240
1220 IFI<17THENGOSUB1680:GOTO1240
1230 GOTO1210
1240 GOSUB1710:GOTO270
1250 X=S
1260 IFFM=1ANDR1>1ANDR1(1)=STHEN1380
1270 IFFM=2ANDR2>1ANDR2(1)=STHEN1380
1280 IFFM=3ANDR3>1ANDR3(1)=STHEN1380
1290 IFFM=4ANDR4>1ANDR4(1)=STHEN1380
1300 IFX>13THENX=X-13:GOTO1300
1310 IFX=UANDW2=0THENT1=6:ER=0:RETURN
1320 IFX=UANDW3=0THENT1=7:ER=0:RETURN
1330 IFX=UANDW4=0THENT1=8:ER=0:RETURN
1340 Y=W1(W1):GOSUB1530:IFER=0THENT1=5:R
ETURN
1350 IFW2>0THENY=W2(W2):GOSUB1530:IFER=0
THENT1=6:RETURN
1360 IFW3>0THENY=W3(W3):GOSUB1530:IFER=0
THENT1=7:RETURN
1370 IFW4>0THENY=W4(W4):GOSUB1530:IFER=0
THENT1=8:RETURN
1380 Y=R1(R1):GOSUB1430:IFER=0THENT1=1:R
ETURN
1390 Y=R2(R2):GOSUB1430:IFER=0THENT1=2:R
ETURN
1400 Y=R3(R3):GOSUB1430:IFER=0THENT1=3:R
ETURN
```


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```
1410 Y=R4(R4):GOSUB1430:IFER=OTHENT1=4:R
ETURN
1420 GOTO1510
1430 X=S
1440 IFX<27ANDY<27THEN1510
1450 IFX>26ANDY>26THEN1510
1460 IFX>13THENX=X-13:GOTO1460
1470 IFY>13THENY=Y-13:GOTO1470
1480 IFX=13ANDY=1THEN1520
1490 IFX=13THEN1510
1500 IFX=Y-1THEN1520
1510 ER=1:RETURN
1520 ER=0:RETURN
1530 X=S
1540 IFX<>14ANDX<>27ANDX<>40ANDX=Y+1THEN
ER=0:RETURN
1550 IFX>13THENX=X-13:Y=Y-13:GOTO1550
1560 IFY<>13THEN1580
1570 IFX=1THENER=0:RETURN
1580 ER=1:RETURN
1590 IFT1=1THENR1=R1+1:R1(R1)=XX:RETURN
1600 IFT1=2THENR2=R2+1:R2(R2)=XX:RETURN
1610 IFT1=3THENR3=R3+1:R3(R3)=XX:RETURN
1620 IFT1=4THENR4=R4+1:R4(R4)=XX:RETURN
1630 IFT1=5THENW1=W1+1:W1(W1)=XX:RETURN
1640 IFT1=6THENW2=W2+1:W2(W2)=XX:RETURN
1650 IFT1=7THENW3=W3+1:W3(W3)=XX:RETURN
1660 IFT1=8THENW4=W4+1:W4(W4)=XX:RETURN
1680 T=0:LS=0:FORI=17TO52:IFT(D(I))=OTHE
NNEXTI:I=LS:RETURN
1690 T=T+1:LS=I:IFT=3THENLS=I:RETURN
1700 NEXTI:I=LS:RETURN
1710 IFDR(1)=1THENB=2:FORZZ=1TOR1:A=ZZ+1
:C=R1(ZZ):GOSUB690:NEXTZZ
1720 IFDR(2)=1THENB=3:FORZZ=1TOR2:A=ZZ+1
:C=R2(ZZ):GOSUB690:NEXTZZ
1730 IFDR(3)=1THENB=4:FORZZ=1TOR3:A=ZZ+1
:C=R3(ZZ):GOSUB690:NEXTZZ
1740 IFDR(4)=1THENB=5:FORZZ=1TOR4:A=ZZ+1
:C=R4(ZZ):GOSUB690:NEXTZZ
1750 IFDR(5)=1THENB=2:A=1:C=W1(W1):GOSUB 690
1760 IFDR(6)=1THENB=3:A=1:C=W2(W2):GOSUB 690
1770 IFDR(7)=1THENB=4:A=1:C=W3(W3):GOSUB 690
1780 IFDR(8)=1THENB=5:A=1:C=W4(W4):GOSUB 690
1790 IFDR(9)=1THENB=1:A=2:C=P(J):GOSUB690
1800 IFDR(10)=1THENB=1:A=11:C=D(I):GOSUB 690
1810 PRINT"[HOME]"TAB(34)SC+((W1+W2+W3+W4)*5)
1820 IFDR(1)=1ANDR1<10THENB=2:FORZZ=R1+1
TO11:C=0:A=ZZ+1:GOSUB690:NEXTZZ
1830 IFDR(2)=1ANDR2<10THENB=3:FORZZ=R2+1
TO11:C=0:A=ZZ+1:GOSUB690:NEXTZZ
1840 IFDR(3)=1ANDR3<10THENB=4:FORZZ=R3+1
TO11:C=0:A=ZZ+1:GOSUB690:NEXTZZ
1850 IFDR(4)=1ANDR4<10THENB=5:FORZZ=R4+1
TO11:C=0:A=ZZ+1:GOSUB690:NEXTZZ
1860 FORZZ=1TO10:DR(ZZ)=0:NEXTZZ
1870 RETURN
```

Formatting & Error Checking

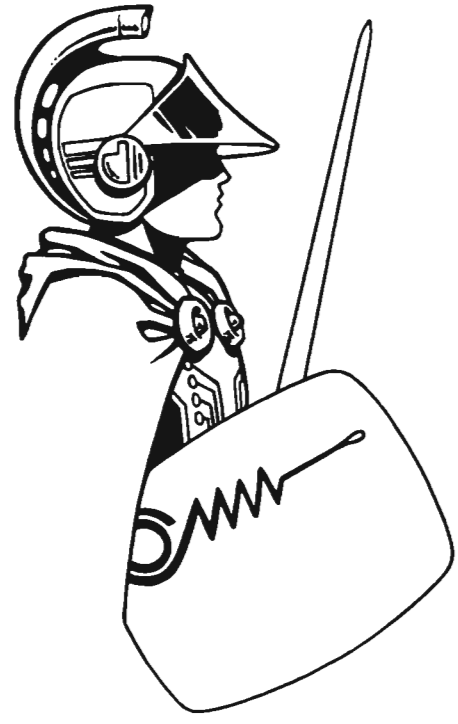
Continued from page 13

return would bring you back to the subsequent line from which you came. We need to re-input, thus lines 10 and 30 are our target lines and only a goto, not a gosub will work here. Also you will notice on the complete demonstration program that A$ and B$ input have 3 shifted spaces and 3 left cursors for further input protection, thus, if just return is pressed without an entry, the program will branch to the error alert routine.

To remove the input prompt (?) after input, you could poke a 96 value to the screen location occupied by the prompt. The 96 value is a blank thus removing the prompt character. No prompt to clutter our display.

You could dress up this program by putting in column headings and tabular borders, as well as change the formula to fit your needs.

So, in summary, we've learned to format and align decimal numeric data, how to error check for correct numeric entry, and how to erase erroneous entries and give the operator another chance. All with a few short routines and a couple of tricks from our bag of programming magic!□



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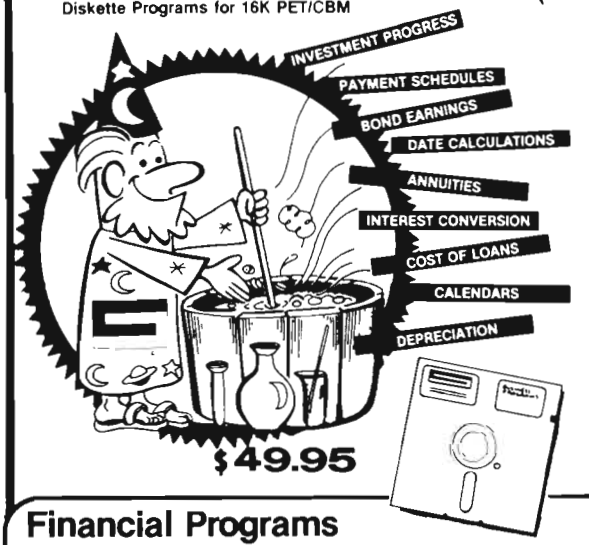

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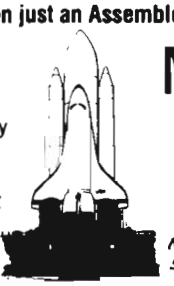

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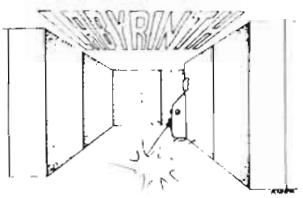

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ADVENTURE WRITING/DEATHSHIP by **Rodger Olsen** — This is a data sheet showing how we do it. It is about 14 pages of detailed instructions how to write your own adventures. It contains the entire text of Deathship. Data sheet - $3.95. NOTE: Owners of TI99, TRS-80, TRS-80 Color, and Vic 20 computers can also get Deathship on tape for an additional $5.00.

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ADVENTURES — Adventures are a unique form of computer game. They let you spend 30 to 70 hours exploring and conquering a world you have never seen before. There is little or no luck in Adventuring. The rewards are for creative thinking, courage, and wise gambling — not fast reflexes.

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TREK ADVENTURE by **Bob Retelle** — This one takes place aboard a familiar starship and is a must for trekkies. The problem is a familiar one — The ship is in a "decaying orbit" (the Captain never could learn to park!) and the engines are out (You would think that in all those years, they would have learned to build some that didn't die once a week). Your options are to start the engine, save the ship, get off the ship, or die. Good Luck.

Authors note to players — I wrote this one with a concordance in hand. It is very accurate — and a lot of fun. It was nice to wander around the ship instead of watching it on T.V.

DERELICT by **Rodger Olsen and Bob Anderson** — For Wealth and Glory, you have to ransack a thousand year old space ship. You'll have to learn to speak their language and operate the machinery they left behind. The hardest problem of all is to live through it.

Authors note to players — This adventure is the new winner in the "Toughest Adventure at Aardvark Sweepstakes". Our most difficult problem in writing the adventure was to keep it logical and realistic. There are no irrational traps and sudden senseless deaths in Derelict. This ship was designed to be perfectly safe for its' builders. It just happens to be deadly to alien invaders like you.

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PYRAMID by **Rodger Olsen** — This is one of our toughest Adventures. Average time through the Pyramid is 50 to 70 hours. The old boys who built this Pyramid did not mean for it to be ransacked by people like you.

Authors note to players — This is a very entertaining and very tough adventure: I left clues everywhere but came up with some ingenous problems. This one has captivated people so much that I get calls daily from as far away as New Zealand and France from bleary eyed people who are stuck in the Pyramid and desperate for more clues.

MARS by **Rodger Olsen** — Your ship crashed on the Red Planet and you have to get home. You will have to explore a Martian city, repair your ship and deal with possibly hostile aliens to get home again.

Authors note to players — This is highly recommended as a first adventure. It is in no way simple—playing time normally runs from 30 to 50 hours — but it is constructed in a more "open" manner to let you try out adventuring and get used to the game before you hit the really tough problems.

QUEST by **Bob Retelle and Rodger Olsen** — THIS IS DIFFERENT FROM ALL THE OTHER GAMES OF ADVENTURE!!!! It is played on a computer generated map of Alesia. You lead a small band of adventurers on a mission to conquer the Citadel of Moorlock. You have to build an army and then arm and feed them by combat, bargaining, exploration of ruins and temples, and outright banditry. The game takes 2 to 5 hours to play and is different each time. The TRS-80 Color version has nice visual effects and sound. Not available on OSI. This is the most popular game we have ever published.

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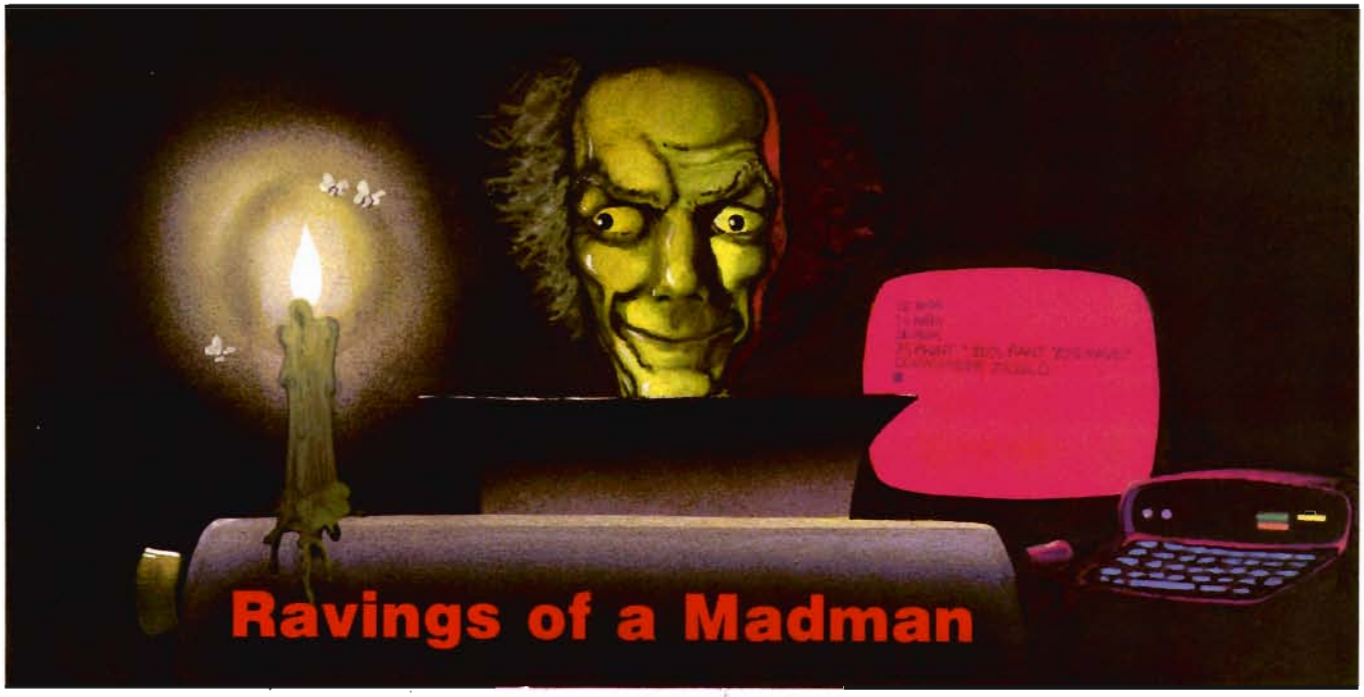


Ravings of a Madman

by Tim Parker
Ontario, Canada

When last I wandered into my local computer store, I was somewhat astonished to find that they had doubled the number of computer magazines they stocked. I had been under the impression that they already had the widest selection around, but the new titles made a somewhat disconcerting display, spread over three browsers!

Computer Magazines Proliferate

Few computerists can be unaware of the large number of magazines spawned in the past few years as this field has grown. (Exactly the same thing happened in video: when Sony released its first Beta recorder, there were no magazines devoted to the field: now there are well over ten. The same thing appears to be happening to video games.) It used to be that there were (in the old days) only a few magazines. **Creative Computing** was one of the first aimed at the starting computerist. For the higher level user, **Byte** was available. Other than that, there were the professional journals, but most were unavailable to the layman. Then, as the Apple gained popularity, the field expanded. When the Atari and VICs were introduced, the field underwent a population explosion.

Now, there is nothing wrong with the number of different magazines available. It is definitely to the user's advantage. The major complaint I hear is that most newcomers to the field are unsure which magazines to buy, and which will be wasted money. The answer to that question is not easy to give. It depends on where your interest lies.

There are now specialist magazines available for most of the big computers. **Commander** is devoted to the Commodore series, and at the moment leads the pack in that respect. (The previous holder to that fades in comparison.) Apple user s have several magazines including **Nibble** and **Softalk,** while IBM users have **PC**. Then there are the "general" magazines, that either cover several types of systems, or have definite editorial slants. For example, for business users, **Interface Age** is aimed at the software most likely to be encountered in that field. Others such as **Byte** are for the most experienced user, although aimed at all systems. Magazines devoted to operating systems are readily accessable. CP/M (the most popular operating system) is supported by two fairly large circulation magazines: **Microsystems** and **Lifelines.** The beginning computerist is not ignored, either. The field has expanded as the publishers realized that there were many computer owners out there that didn't have the technical background previously assumed.

Which to Buy?

The major difficulty lies in trying to find a few good magazines that suit you, and deliver the content you require without wasting your hard earned dollars. Obviously, the magazine(s) devoted to your specific machine should be included on your reading list. A few general magazines couldn't hurt either. For those who are software oriented, there are several of the big circulation monthlies that fit the bill. Hardware magazines are somewhat scarcer, but do exist. So try a few different ones, and judge each on its content, and whether it appeals to you. Then stay with them. That way, you'll stay informed of most of the breakthroughs and developments. This habit does tend to eat up the money that can be used on software, but some magazines will give more useful information than a shoot-em-up can offer! (As an owner of four different systems, from small to large, the reading begins to get exorbitant: over ten magazines a month just for the

hobby!)

Do not be put off by the size of some of the magazines. While **Byte** has a width that quickly fills shelves, a large chunk of that is advertising. On the other hand, a magazine such as this erudite publication has far more content than adverts. And the information is usable by the majority of readers! What more could anyone ask for? (No one will ever accuse me of being biased!)

Exchangeable Software

An interesting development came to my attention several months ago for the VIC-20. A few hardware oriented friends of mine had put together a breadboard that would play Atari VCS games on the VIC. The next month I saw two separate advertisements for the same purpose. This will probably be welcome to most VIC-20 owners, primarily because of the number of games now playable on the VIC. The quality of the Atari VCS games does not approach the limits of the VIC, with block characters in most games, but there are so many that have become classics that the option to play them is now available for less than a hundred bucks.

Developments like this, though, are illustrating a point I tried to make in my first column (was it really that long ago?) for Commander. At that time, I tried to point out that the VIC-20 is not simply a toy, but a real honest-to-goodness computer (albeit somewhat smaller than others). Now, as eighty column boards, modem packages, expanded memory boards, emulation modules, PROM (programmable Read Only Memory) burners, and many other hardware features become available, the VIC progresses from the 5K machine first found in a cardboard box. When added on to, the VIC can be transformed into a truly powerful computer. (One fellow I know has a VIC-20 emulating a Televideo terminal, at a fraction of the cost!) While graphics of the VIC-20 chip are not as powerful as the sprites in the VIC-64, they are more than adequate for the majority of purposes. Sound (again the VIC-64 has an edge here) is better than any other comparable personal computer on the market.

The important point is revealed by two words on the last line of the previous paragraph: personal computer. Used to be, only the Apple, Atari and IBM were considered personals. The VIC was great at games, but 5K? By a technique known as paging or block selecting, the 6502 processor in the VIC-20 can handle far more than 64K of memory (the theoretical limit for a 8 bit machine.)

To repeat something from my earlier column, consider the following: buy an Apple II Plus, with two disk drives, controller card, eighty column card, modem card, printer card, and joystick adapter. Compare the cost to a VIC-20 with two disk drives, eighty column card, modem plugin, and joystick. Then pay your money for the best buy. Ever wonder why the VIC-20 sold so many units? Now you know.

A quick addendum to the remarks on games made in the January Commander. Many new games have appeared over the last three months. It is virtually impossible to keep track of the different companies, let alone their titles! Several of the games that I have seen were astonishing, to understate the issue. The accomplishments of the programmers are remarkable. However, there were (inevitably) a few duds. (Again, check the game before buying if possible.)

One very encouraging note was that one major software house that sells some superb games for the Apple II has released VIC-20 versions. Although I have not had the opportunity to preview the VIC editions, if they are anything like the Apple versions they are sure to become favorites. I hope more companies follow this trend. (Thanks, Creative Software.)

Back-up Copies

A few letters I have received have asked about backing up copies of some of the better games. Although it is not possible to completely protect a game on the VIC, some publishers have developed some rather interesting tricks to avoid unlicensed duplication. (These techniques are not infallible, but I am bound by ethics to not disclose the secrets.) Most of the games are written in machine language, and that is a major stumbling block for many people. Machine language programs cannot be SAVEd the same way a normal BASIC program is: the computer has to be told where the program belongs in memory. This is the reason for most failures at backing up games.

The logic in backing up programs cannot be faulted. It is nice to have a reserve copy of all software in case an (heaven forbid) accident happens to the original. (Most professional programmers back everything up as a matter of course.) I do not believe any purchaser should be prevented from protecting his investment, either. Unfortunately, the software companies do not agree with me. I have to leave it up to your own ingenuity to solve your problem. (It's not that hard, really!)

Several software releases for the VIC-20 deserve mention. Although a word processing package for the '20 has been available almost since day one, they are finally getting to the point where they are of some versatility. Advertisements in several of the magazines last month touted a package that seems to fit the bill. Released by UMI, who have been mentioned here before, it is called "Wordcraft 20." Although I have not run it (I have a large CP/M machine for my word processing), the preliminary reports I have heard have been encouraging.

A package called "Quick Brown Fox" from Quick Brown Fox (who else?) offers expandability in word processing. As column expansion cards, printers, disks and memory are added, the program easily adapts to them.

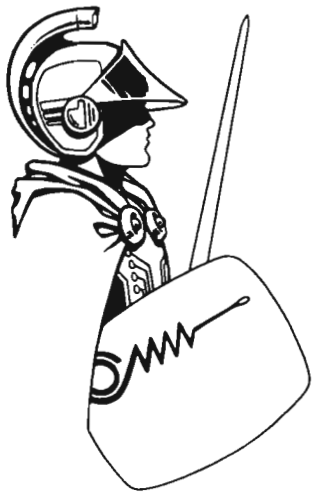
Yet another word processor that is getting some good comments is "Rapidwriter Plus" from Rapidwriter. Unfortunately, I have few details about the package, so I have to restrict my comments to a mention en passant.

Speaking of en passant (tricky, eh?), a new chess program from Kavan Software (distributed by Data Equip-

ment Supply Corp.) called "Boss" is supposedly able to beat Sargon II consistently. It offers ten levels of play, two chess clocks, moves such as en passant, and allows rearranging of the board virtually at will. Written completely in machine code, it ran at a good speed. "Boss" requires at least an 8K expansion. (Chess players here is the rationalization for the memory board you've been looking at.)

Finally, a surprise to me. Back when floppy disks and disk drives were rather esoteric pieces of equipment for most home computers, a company called Exatron developed a "Stringy Floppy". A stringy floppy is a cartridge of looped tape about the size of a business card. It runs many times faster than a cassette; typically at 7200 baud. Each cartridge handles around 64K of memory, and is available for the cost of a standard cassette. This was very popular several years ago with machines such as the Radio Shack computers, and now is available for the VICs (20 and 64). If a disk drive is out of reach of your budget, this is definitely a product to be looked at in some detail.

In closing this month, I would like to extend my thanks to all the people who took time to write and comment on these miscellaneous ramblings. They always start with no preconceived plan, and usually end up showing that rather well! Nevertheless, the response has been somewhat astonishing. Nary a nasty word was uttered! If this keeps up, I'll be spending all my life at the keyboard. 'Tis a consummation devoutly to be wished.□



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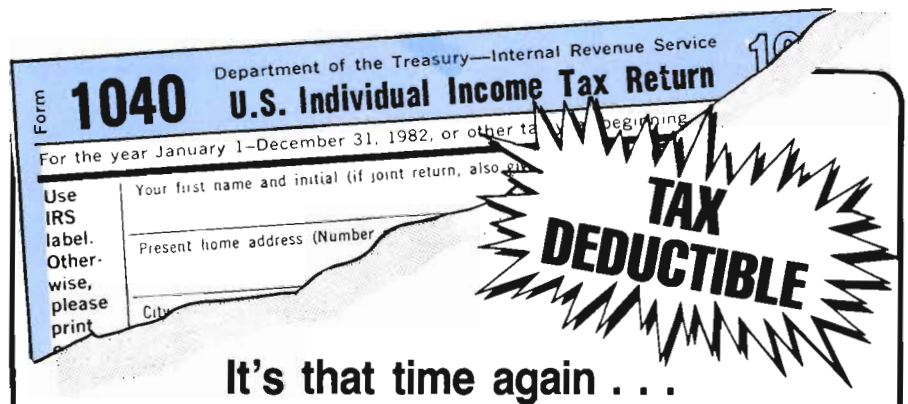
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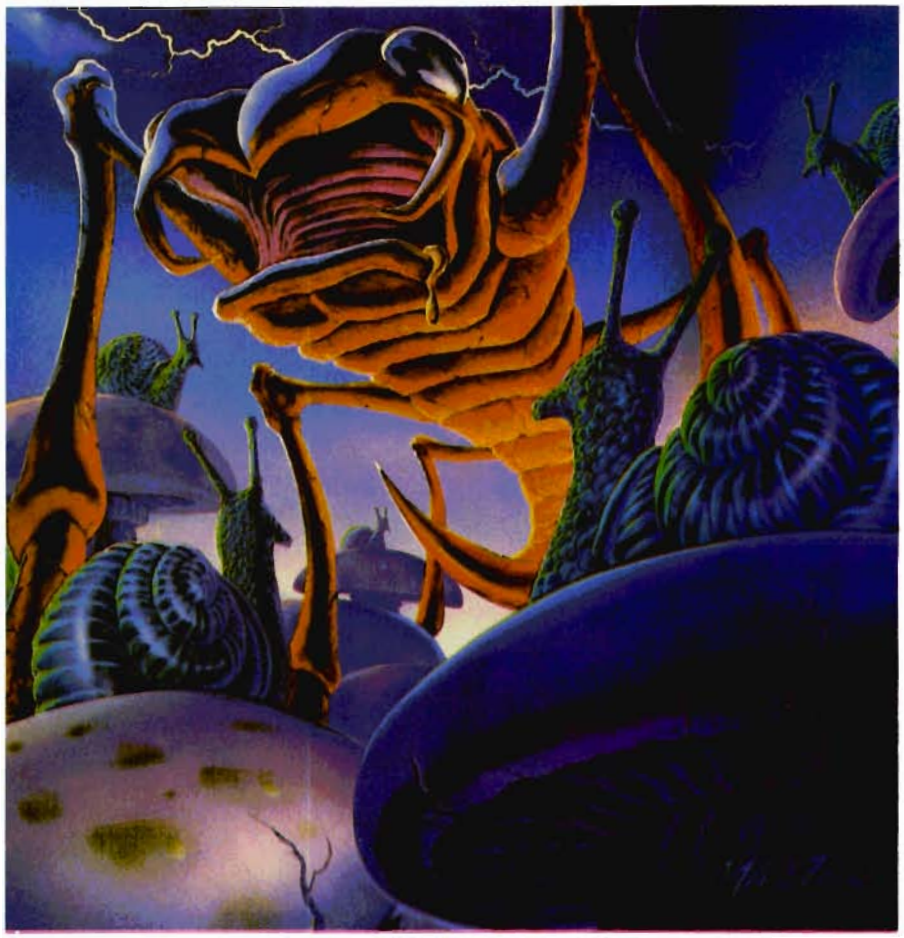

The Game Contest is a continuing feature of Commander magazine aimed at providing entertainment for and promoting competition among our readers. United Microware Industries has graciously provided us with February's Game Contest.

DEADLINE FOR ENTRIES: JUNE 1, 1983

Video Vermin may be purchased from United Microware Industries or any one of its fine dealers.

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Terms for Game Contest

First prize will be awarded to the person with the highest score. The winning entry must contain a photograph of the highest score of the game. A Video Vermin package front and proof of purchase slip.

Entries must be mailed to Commander, Video Vermin Contest, PO Box 98827, Tacoma, WA 98498. All entries must be mailed, as postmarks are required to determine the earliest winning entry. In the event of a tie, duplicate prizes will be awarded. Employees of United Microware Industries and their families may not participate. First prize will be $250, second prize $100, third prize $50.

The contest will run until a first prize is awarded. United Microware Industries will notify Commander Magazine of the winner(s) and provide copy and photographs for a follow-up story.

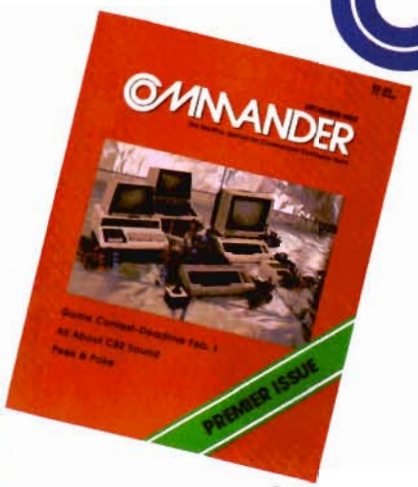
Video Vermin

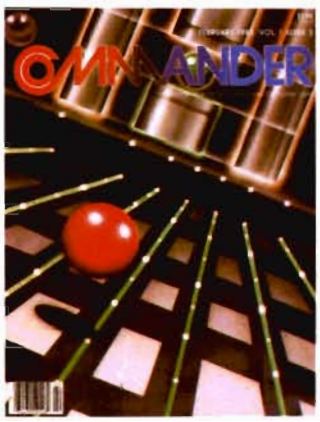
Your once-peaceful garden is being invaded by a hoard of hungry Vermin. Shoot them and their fallen bodies sprout a barricade of mushrooms to conceal more swarming raiders. Snails oil path on which the Vermin slither erratically toward you. Dropping butterflies leave a trail of mushrooms in their wake, and pouncing spiders, ants, beetles, and fleas infest the area. One vigilant gardener strikes first. If he's destroyed by the fatal touch of the invaders, two more defenders lie in wait to take his place. If the third gardener succumbs, and you have 10,000 points, another gardener will emerge to help save the garden from devastation.

I thought it was going to be a peaceful afternoon, just me and my

Continued on page 61

COMMANDER





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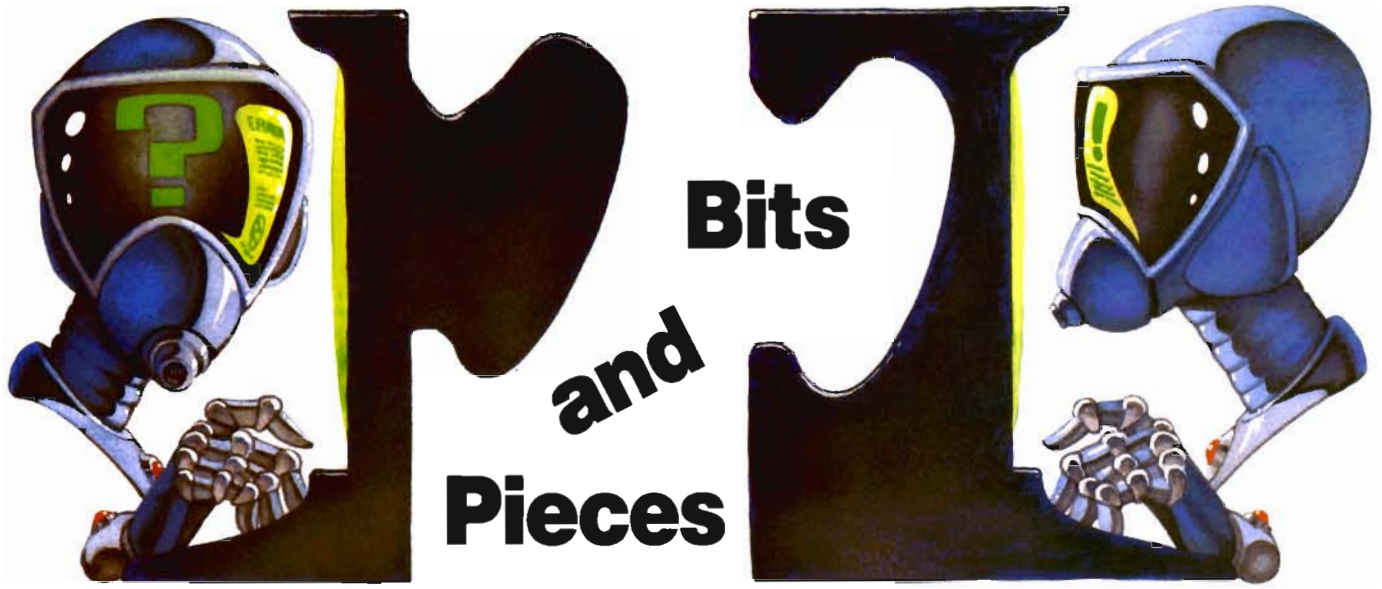

Editor's Note: Our new Bits and Pieces department will spotlight questions put forth by our readers and feature the answers provided by other readers or one of Commander's technical experts.

Dear Sir or Madam:

We do our monthly reports on a CBM 8032. We have use of a TRS-80 DMP100 printer, but don't know how to make them compatible. Please help us out.

Several companies have suggested hardware/interfaces, but none of them are sure the equipment will work, since they have not actually tried the CBM8032—TRS80 DMP100 together.

What can you suggest? Do your readers have the answer? We ourselves are initial subscribers.

Thank you.

R. Ellis
Mem Investment Club

Dear Sirs:

I would like to address two topics in your premier (Dec, 1982) issue.

On page 32, a note about Zenith and VIC's is made. I have a 64 which has enormous white flashes on the screen whenever the computer is running. Therefore, I tried the hint but it had no effect on the white flashes. (It did affect the program in storage.) Do you know if the flashes can be cured? I should add that when I wrote above "whenever the computer is running," I was referring to transmission, not power. Thus if the 64 is waiting, in READY, or from an INPUT statement, there are no flashes of white, and when the 64 is not in use, there are no flashes, and none when LOADing or SAVEing. Does the POKE3654,133 change for the 64? I did do the poke over the first line where it says 38911 bytes free.

My second comment has to do with the program "Blocks." It scrolls when the lefthand (Lh) player uses the bottom right hand corner. This causes a wipeout on the righthand (Rh) player if there is a block of his with a block below it. I have spent some time looking at the logic of the program and ZP = 1 in line 350 is supposed to prevent scrolling; see lines 590 and 900. Only the Rh player scrolls for me, the Lh player does not. I have tried various fixes but none work. One problem is understanding the use of ZR and ZL. Anyway, if you could look into this also, I'd appreciate it.

Sincerely yours,
Vincent J. Mooney, Jr.

Am I the only VIC-20, RS-232 printer user? It seems that way when it comes to getting information or buying software. When you do find anything on the RS-232 interface, it's on the modem only. It's time we stood up and be counted. Let's have a RS-232 information exchange on printers and disks. Write to me and let me know any of your experiences with the RS-232 interface. If there are enough, maybe we can start our own users group.

The reason I ended up with this problem is as follows. This guy I work with, had a rebuilt Data Products DP-50 daisy wheel printer for sale. Only $250.00 but little did I know what was ahead. I bought a Quantum Data Model 1800 printer. Which is a RS-232 interface connected to the users port. Hey, this is great, now all I have to do is power up, and we are in business. WRONG! My first problem, it didn't line feed. Everything printed on the same line. After many failures and much research, I found the answer. I had to use open128,2 or greater. That was in May of 1982. Only you who have experienced this will know that wasn't the only problem. For you beginners here's a couple hints.

To list a program, use

```
OPEN128,2,0,CHR$(6):CMD128:
LIST
```

Explanation: You must use greater than 127 for line feed, in this case 128. The 2 is the users port device. The CHR$(6) prints in 300 baud.

To convert to standard ASCII subroutine

```
1000 REM Standard ASCII
     subroutine
1010 X=LEN(P$):IFX<1THEN
     1060
1020 FOR I=1TOX:X$=LEFT$
     (P$,I-1):SS$=MID$(P$,I,1):Z$=
     RIGHT$(P$,X-I)
1030 Y=ASC(SS$):IFY>64
     ANDY<9 1THENSS$=CHR$
     (Y+32):GOTO1050
```

```
1040 IFY>192ANDY<219THEN
   SS$=CHR$(Y-128)
1050 P$=X$+SS$+Z$:NEXT
1060 RETURN
```

Boy, would I like to have a way to change some of the Vic printer programs to print on my printer.

Write to me Daryl E. Williams c/o DEW-RITE ENTERPRISES, P.O. Box 1932, Santa Ana, Ca. 92702. □

If you do not have software to merge two programs, the following procedure makes it a simple matter to merge a subroutine with a program you are writing. The only condition is the subroutine is limited to the number of statements that will fit on the screen.

If you are using a Commodore 64 and tape use the following procedure.

1. Load the subroutine into the computer.
2. Position the tape just before a copy of the program you are writing.
3. Hold down shift and press "CLR HOME".
4. Then type "LIST" and press "RETURN".
5. Move the cursor over the R in RETURN.
6. Type "LOAD" and press "SPACE" twice.
7. Press "RETURN" and proceed with loading.
8. Once your program is loaded press "HOME".
9. Then press "RETURN" once on each subroutine statement.

You are now ready to list the merged programs.

With a disk the procedure is essentially the same except in place of typing "LOAD" in step (6) above type "LOAD" "name of prg",8". With tape you will be able to use a subroutine with a maximum of 14 lines and with disk the limit is 19 lines. A larger subroutine could be handled in two or three parts. □

Debugging & Fixes of Programs

Commander has dedicated this column exclusively to the Debugging and Fixes of Programs. We want to keep our readers informed of any changes or mistakes in programs we publish. This column is designed for that purpose only. If you as a reader find any bugs, please let us know. —Editor

Volume 1, Issue 2

—Parity Check—

The [\+] in line 920 of the SOUNDER program January 1983) means enter the plus sign while holding down the Commodore shift key. Sorry for any confusion. GRG

Fixes

Why Didn't I Think of That?

Page 16, first paragraph: 50 octal converts to 40 decimal.

Page 20, bottom, line ØØ2Ø: WHILE I≤1Ø

Page 21, top, line ØØ5Ø; UNTIL I≥1Ø

Page 21, third paragraph: A$ (6:2) would be IS □

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New Products

Commodore Introduces $300 Color Monitor

(7 Jan. 83—Valley Forge, PA) Commodore Business Machines, Inc. (NYSE:CBBU) has introduced a low-priced color monitor especially designed for its line of home, school and business computers.

The announcement was made by Robert H. Lane, Commodore's president in charge of North American operations.

Lane said the new 13-inch monitor—designated the "CBM 1701"—retails for $299.95 and was especially designed for use with the COMMODORE 64 and VIC-20 personal computers. The monitor accepts a standard 75 ohm composite video signal or a "Commodore" video signal with separate provisions for luminance and chrominance signal input as well as audio input.

The monitor was developed in conjunction with a major television manufacturer, he said, and includes special circuitry which greatly enhances the picture resolution. Commodore has applied for a patent on the design.

"From a marketing viewpoint, we're in the business of responding to our customers' needs," he said. "For a long time, our customers have been complaining about the high price and low quality of color monitors. Many computerists have to keep connecting and disconnecting their computer from their family TV set every time they use it. Those people need a dedicated monitor, but it has to be affordable."

"From a purely business standpoint, we've diversified into color monitors because a color monitor is a key component in any color computer system, and in 1983 most computer retailers will begin to sell computers like stereo component systems. We want our retailers and their customers to be able to buy their full system from Commodore."

Commodore expects first delivery of the new monitor by March 1, 1983.

Commodore Business Machines, Inc. is the world's leading manufacturer of color computers. The company developed the first self-contained desktop computer (the PET) in 1977, the first color computer priced under $300 (the VIC-20) in 1980, and the first 64K color computer priced under $600 (the COMMODORE 64) in 1982. As a vertically-integrated computer manufacturer, Commodore designs and produces its own semiconductor devices—including the 6502 microprocessor, developed by Commodore's MOS Technology subsidiary.□

Color Printer/Plotter from Commodore

(7 Jan. 83—Valley Forge, PA) Commodore Business Machines, Inc. (NYSE:CBU) today unveiled a new printer/plotter priced at $199.95 retail.

The announcement was made January 7 at the Consumer Electronics Show in Las Vegas by Robert H. Lane, Commodore's president of North American operations.

The accessory uses 4½ inch roll paper and prints in four colors—or combinations of colors—to achieve multi-colored graphs, charts and other types of illustrations which are enhanced by the use of color. High resolution illustrations are achieved by the printer/plotter's ability to "step" 480 dots horizontally and up to 999 steps vertically.

Four separate ball point ink pens provide a clean, high quality color image and the 5 inch wide carriage accommodates standard roll paper.

"The printer/plotter complements and rounds out our existing line of low-priced computer printers," Lane said. "A healthy segment of our market wants color printing and plotting capabilities, and this new printer/plotter meets that need."

The device is easily programmed from BASIC and requires no special modification to use. Business or educational statistics can be generated on a Commodore computer such as the VIC-20 or COMMODORE 64 and displayed graphically, in color.

The printer/plotter is designated the CBM 1520 Printer/Plotter. First units are scheduled for delivery during January 1983.□

Commodore Adds Computer Desk to Its Product Line

(7 Jan. 83—Valley Forge, PA) Commodore Business Machines, Inc. today announced the addition of a low priced computer desk to its line of

Computer products marketed through authorized Commodore dealers.

Designed specifically for computers and their peripherals, the desk has a ventilated compartment for a disk-drive, a handy shelf for storing disks and other accessories; as well as special slots to conceal equipment cables. The sturdy, steel-framed desk stands at a comfortable height for typing on a computer keyboard.

The desk top (26" x 48" x 1⅛" thick), is made of durable easy-care Arborite and is T-molded with rounded corners. The steel legs have adjustable leveling glides.

The suggested retail price for the Commodore Computer desk is $279.00.

Commodore Business Machines, Inc., is a wholly owned subsidary of Commodore International, Ltd. (NYSE:CBU), a fully-integrated manufacturer of advanced microcomputer systems, consumer electronics products, semiconductors and office equipment. Commodore's Computer Systems Division markets the Commodore MAX Machine™, VIC 20™, Commodore 64™, PET®, CBM™ and SuperPET™ systems and software to major accounts and stores. □

CX6401B Commodore 64/VIC-20 Parallel Printer Interface

ECX COMPUTER COMPANY announces its new Model CX-6401B printer interface for the Commodore 54 and VIC-20 computers. The CX6401B interface allows these computers to use ANY type of standard commercially available parallel interface type printer. This new interface is fully compatible with the popular WORDPRO 3+ wordprocessing program. In addition CX6401B also has all of the features of the original CX6401 model.

The CX6401B interface connects to the SERIAL PORT/BUS on the computer, NOT the user port, allowing the user port to remain open for use by a MODEM or other RS-232C peripheral device.

Some of the key features of the CX-6401B are:

*Compatible with WORDPRO 3+ wordprocessing program.
*Eliminates hand shaking problem of RS-232C cartridge.
*Mode switch to correct ASCII problem.
*No expensive RS-232C cable necessary.
*Lower cost than RS-232C type hook-up.
*Allows use of lower cost parallel type printers.
*No external power required.
*Allows use of multiple printers.
*Unused user port lines available for external usage.

The CX-6401B comes standard with a 3 ft serial bus cable and connector for direct connection to the Commodore 64 or VIC-20 and a 1 ft parallel cable for connection to the printer.

Suggested Retail Price: $89.95

For more information contact:

ECX Computer Company, 2678 North Main St., Walnut Creek, Ca. 94526. (415) 944-9277.□

CX6405 Commodore 64/VIC-20 Epson MX Series Printer Interface

ECX COMPUTER COMPANY announces its new Model CX6405 EPSON printer interface board. The CX6405 allows the new Commodore 64 and VIC-20 computers to connect directly to any model of the EPSON MX series of printers, including the new high speed FX-80 F/T. The CX6405 installs internally within the EPSON MX series printers. This new interface is fully compatible with the popular WORDPRO 3+ wordprocessing program.

The CX6405 interface connects to the SERIAL PORT/BUS on the computer, NOT the user port, allowing the user port to remain open for use by a MODEM or other RS-232C peripheral device.

Some of the key features of the CX6405 are:

*Compatible with WORDPRO 3+ wordprocessing program.
*Eliminates hand shaking problem of RS-232C cartridge.
*Mode switch to correct ASCII problem.
*No expensive RS-232C cable necessary.
*Lower cost than RS-232C type hook-up.
*Allows use of multiple printers.
*No external power required.

The CX6405 comes standard with a 3 ft serial bus cable and connector for director connection to the Commodore 64 or VIC-20.

Suggested Retail Price: $79.95

For more information contact:

ECX Computer Company, 2678 North Main St., Walnut Creek, Ca. 94526. (415) 944-9277.□

Verbatim Offers Free Exercise Guide for Workers in Automated Offices

A new exercise guide, dubbed "Tone Up at the Terminals," has been developed by VERBATIM CORPORATION to help operators of automated office equipment alleviate job stress and muscular strain.

Endorsed by the California Governor's Council on Wellness and Physical Fitness, the 12-page booklet is being published in response to the findings of a recent nationwide survey by Verbatim, which polled office workers attitudes to new technology in the workplace. The study by the Sunnyvale-based manufacturer of magnetic data storage media showed that over 68 percent of respondents had health concerns about the extended use of word and date processing machines. Specifically, 63 percent said they experienced eyestrain and 36 percent cited backstrain. In addition, nearly eight in 10 wanted regular rest breaks and better lighting.

According to Malcolm B. Northrup, president and chief executive officer of Verbatim, "there is little evidence to suggest that machines themselves are the culprits. Rather, elements in the working environment, work pressures and the amount of time spent at the machines have some bearing on the physiological strain felt by many office workers."

Northrup believes that regular exercise breaks will do much to help com-

puter and word processing operators overcome the symptoms of technological stress while increasing concentration and performance levels.

His company commissioned Los Angeles-based exercise physiologist Denise Katnich to design and demonstrate the 20 exercises featured in Tone Up at the Terminals. They can be done at an automated work station in a matter of minutes and require no special skills or athletic abilities.

"Studies have show that exercise improves the ability to relax," notes Katnich. "During a hectic day muscles store up tension which can lead to back pain, stiffneck or headaches. Increased circulation through exercise can reduce or eliminate nervous fatigue as well as improve memory and cognition."

Katnich begins the Tone Up at the Terminals routine with four warm ups that include "wobbling" the neck, reaching with the arms, deep breathing, and tensing the muscles. Then she instructs how to stretch and relax every part of the body, beginning with the neck and continuing through the shoulders, arms, pectoral muscles, the quadriceps, back, trunk and knees. Even the fingers and wrists get attention. Appropriately, the last exercise is a self hug, which Katnich says, "relieves tension from shoulders and upper back."

The exercise booklet has been reviewed and approved by the California Governor's Council on Wellness and Physical Fitness. "The impact of new technology on the health of office workers is a major concern of the council and Verbatim is to be commended for addressing some of the problems associated with the changes in today's office environment," says executive director Theodora Wilner.

Free copies are available on request from Verbatim Corporation, Attention: Tone Up at the Terminals, 323 Soquel Way, Sunnyvale, CA 94086.

Prowriter

The PROWRITER is a new dot matrix printer offering professional quality printing. The PROWRITER, which is the newest member of the C. Itoh family, includes 120 cps bidirectional printing, logic seeking and proportional spacing combined with excellent resolution. Graphics capability is built-in and includes shape and high resolution features. The PROWRITER has 1K buffer in parallel and 2K buffer in serial, incremental printing ability, 7x9 dot matrix, and offers correspondence quality print in eight character sizes. The PROWRITER offers built-in tractor feed and friction feed that will accept single-sheet feed. Its paper cut-off is less than one inch from the print line. Vertical and horizontal tabbing is automatic and due to the use of a stepper motor, the PROWRITER is very quiet.

Manual functions include Select, Line Feed, Top of Form and Power-On, combined with Paper Empty, and Cover Open Switches. PROWRITER is available in either parallel or serial (RS-232-C) interface. The serial version actually includes both the parallel and serial interfaces. The PROWRITER also includes X-On/X-Off, Ready/Busy, ETX/ACK, and Current Loop protocols. Suggested retail for the parallel model is $595 and $745 for the serial version.

The PROWRITER is also available in wide carriage. The PROWRITER 2 is the same as the PROWRITER, but offers a 15" carriage and up to 231 columns in compressed print. Suggested retail for both models of PROWRITER 2 is $995. Both serial and parallel PROWRITERS come with a one year limited warranty on parts and labor, and are supported by Nationwide Authorized Leading Edge Service Centers.

For more information, contact Leading Edge Products, 225 Turnpike Street, Canton, Massachusetts 02021. Toll-free 1-800-6833—in Massachusetts, call collect (617) 828-8150. □

One Stop Shopping for Printers

Finally, one family of printers that covers every business, data or word processing application. All from C. Itoh and distributed exclusively by Leading Edge Products, the fastest growing distributor of microcomputer peripherals in the U.S.

The PROWRITER is a new dot matrix printer offering correspondence quality copy at 120 CPS.

The PROWRITER 2 is the same as the PROWRITER but has a fifteen inch carriage. Both are available with parallel or parallel and serial interfaces.

The STARWRITER is a 40 CPS letter quality daisy wheel printer. It features a low profile design only six inches high.

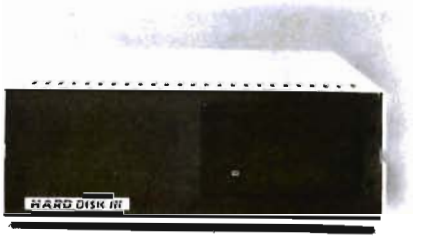
The PRINTMASTER does everything that the STARWRITER will do except it does it at 55 CPS and is also only six inches high.

Both the STARWRITER and the PRINTMASTER are available in standard parallel or serial RS232-C interfaces with extensive built-in word processing functions that allow easy adaptability for all data and word processing applications.

Leading Edge has ten warehouses strategically located across the U.S. and has over 250 employees.

For further information contact Leading Edge Products at 1-800-343-6833 or write to 225 TURNPIKE STREET, CANTON, MA 02021. In Massachusetts, call collect (617) 828-8150. □

Ram Expansion Cartridges



CENTURY MICRO announces the release of their 8K and 16K ram expansion cartridges for the VIC-20

home computer. These cartridges are enclosed in quality plastic cases and use CMOS static ram chips for low power consumption.

The ram expansion cartridges are available at these prices: 8K retails for $47.70 and and 16K for $69.90.

CENTURY MICRO, 7881 La Riviera Drive, Suite 131, Sacramento, CA 95826. (916) 386-0711. Quantity discounts available for clubs.

Commodore Introduces HHC-4 Handheld Computer

(7 Jan. 83—Valley Forge, PA) Commodore Business Machines, Inc. has announced the introduction of a handheld computer/calculator which can be used as a portable computer and full-function calculator, or connected to a TV for full screen computing.

The new handheld computer—called the "COMMODORE HHC-4"—was unveiled at the Consumer Electronics Show January 6-9 in Las Vegas.

Robert H. Lane, Commodore's president for North American operations, said the handheld computer will expand Commodore's product line to encompass an area where "significant future growth is anticipated."

"With the home computer revolution well underway, the time is right for a consumer-oriented handheld computer which combines the power of a programmable calculator with the versatility of a true computer."

The Commodore HHC-4 forms the nucleus of a portable computer system which is easy-to-use and compact enough to carry in a briefcase.

Memory starts at 4,000 characters of memory (4K RAM) and is easily expanded to 16,000 characters (16K RAM) with the addition of a plug-in memory expansion cartridge. The computer contains a powerful 20K ROM operating system which supports the built-in BASIC computing language as well as special calculator functions.

The HHC-4 can be operated as a calculator with the flick of a switch. In addition, all numeric functions and variables contained in BASIC can be utilized . . . and it's easy to make printouts of calculations as well as BASIC programs.

The compact computer uses the world standard QWERTY style keyboard, with a separate calculator keypad. One-stroke BASIC functions make the HHC-4 especially easy to program.

Information may be viewed on a built-in 24 character liquid crystal display, or—with the addition of a TV interface—on a standard television or monitor.

A combination mini-printer and peripheral interface provides fast (24 characters-per-second), silent printing, with an option to connect larger dot-matrix printers.

An RS-232 Interface connects the HHC-4 to other Commodore personal computers, to provide a portable extension of more powerful information processing and retrieval systems.

The computer is powered by 3 AA batteries with a rated life of 300 hours of operation.□

Commodore Introduces First Speech Technology Product

(7 Jan. 83—Dallas, TX) Commodore has announced a sophisticated new voice synthesizer for the Commodore 64 home computer. This is the first voice I/O product to be developed at the company's Speech Technology Division in Dallas, Texas.

The low-cost speech add-on is capable of generating a wide variety of voices—including female and children's voices—for games and learning cartridges, and will be usable from the Commodore BASIC programming language.

The voice peripheral has three modes of operation: two of which are immediately available with the basic module, and a third with the purchase of optional cartridges.

The Commodore voice module can be used as soon as it is inserted into the cartridge port of the Commodore 64. When the Commodore 64 is powered up with the voice module, the

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user may create speech through simple BASIC commands, such as:

```
Say "A", "B", "C", or
10 SAY "ENTER YOUR NAME"
20 INPUT B$
30 SAY "THANK YOU"
```

This short program instructs the computer to speak the name typed in from the keyboard.

Besides the capabilities added to the BASIC language, the module features a built-in learning activity called "A Bee C's"™, an instructional program that uses speech to teach the alphabet to pre-schoolers.

The most exciting feature of the voice module, however, is its capability to integrate voice into games and learning cartridges. Commodore is now developing cartridges that will offer the widest variety of exciting games and instructional material for home use. The voice synthesizer's ability to accept different vocabularies and different "characters" voices means Commodore computer owners will be able to choose the type of voice (male, female, child's, cartoon character, etc.) used with various programs.

This flexibility is achieved through a special technique which allows speech to be generated while the computer's microprocessor is performing other functions such as graphics/cartoon animation.

For example, the technique allows the computer to put an animated face on the screen simultaneously while speech is being generated.

Pricing for the speech synthesizer has not been announced but the product is expected to retail for under $100, with delivery scheduled for Spring 1983.□

Gortek & Microchips Teach Children How to Program

(7 Jan. 83—Valley Forge, PA) Commodore Business Machines, Inc. (NYSE:CBU) today unveiled "GORTEK"—a new robot-like character who will be helping children learn to program in a unique series of books and cassette tapes, the first of which is entitled: GORTEK AND THE MICROCHIPS™.

This delightful and unique concept in teaching young people to program combines a space adventure story with lessons in BASIC programming. Gortek comes in two versions, for the Commodore VIC-20 and COMMODORE 64 color computers.

The first lesson is designed for children under age 14, and consists of 2 cassette tapes containing 12 educational programs and a colorful glossy instruction book which reads like a comic book while teaching the fundamentals of BASIC. The book includes imaginative full color illustrations, large easy-to-read type, and is written so it may be read by older children . . . or used by younger children with parental assistance. The unique combination of computer lessons and storybook format makes Gortek a fun experience for adults as well as children.

As the story goes, the planet Syntax is being invaded by the fearsome Zitrons. Gortek is working furiously to teach the microchips to program the computer to repel attack. The "Microchips Training Manual" teaches the child how to help stop the Zitrons (by learning how to program the computer!).

Those who complete the lessons and successfully repel the Zitrons earn the right to wear the Gortek badge which comes in the package.

This innovative approach to computer education was developed by three British school teachers who wanted to make programming fun to learn. The result is a pioneering achievement in the field of computer education.

Commodore introduced the new "Gortek" product line at the Consumer Electronics Show in Las Vegas January 7. Gortek is scheduled to begin delivery to stores by February 1.□

Commodore DIGI-DRUM(tm) for the Commodore 64 & VIC-20 Computers

(7 Jan. —Las Vegas)—Imagine an electronic drumset controlled by computer, with volume control and sound generated through a TV set, monitor or stereo system . . . but priced as low as a video game cartridge!

Commodore has introduced a low-priced three-pad electronic drumset called DIGI-DRUM(tm) which attaches to the COMMODORE 64 and VIC-20 personal computers.

The new peripheral plugs into the computer's expansion port and comes complete with special software which lets the user simulate a snare drum, bass drum and "high hat" cymbal, with startling realism.

The combination of computer and DIGI-DRUM(tm) visually displays 3 animated drums on a television screen, which "perform" with each drumstroke. The three drums can be combined in an infinite variety to produce high quality rhythm effects suitable for entertainment, learning or sound effects.

DIGI-DRUMmers can use their VIC-20 or COMMODORE 64 computer to create and save drum routines and play them back through their stereo system or television speaker.

First delivery of DIGI-DRUM(tm) is scheduled for Spring/Summer 1983.

New VIC-20 Software Looks Like "Paperback Books"

(7 Jan. 83—Valley Forge, PA) Commodore Business Machines, Inc. (NYSE:CBU) has introduced a series of software products for the best-selling VIC-20 computer which resembles paperback books in theme, packaging and content.

The products were introduced at the Consumer Electronics Show January 7 in Las Vegas.

The first five titles in this series include: "Know Your Personality," "Know Your I.Q.", "Know Your Child's I.Q.", "Robert Carrier's Menu Planner" and "Quizmaster." All programs include a booklet and computer tape cassette(s) and were developed for Commodore by recognized experts in their field."

"We all want to know more about ourselves," said Michael S. Tomczyk, Commodore's product marketing manager. "Many people don't know

their I.Q. or their child's I.Q. but they'd like to find out without having to track down a university testing center or pay a large fee for a test. A computer is a wonderful interactive way to take an I.Q. test . . . or any other test, for that matter."

But giving tests is fun and helpful, too, so we developed a neat program called "Quizmaster" which lets you design your own test. This one is not only useful for giving tests in a classroom, but it's great at parties and for trivia contests."

Bookstore 'Fair Game' for Computers

"Any topic you can find in a bookstore is fair game to be converted into a computer program. In 1983, software will look more like paperback books. It will feature topics that play off of fads, novelties, educational interests, self-improvement needs and all the other themes that make paperback books popular."

"We're already selling 'computer novels,'" Tomczyk said. For example, we at Commodore have seen a tremendous interest in our half-dozen Scott Adams Adventure Games—interactive novels which lead the reader through a computer controlled adventure where all decisions are made by the reader. Computer owners are looking to their computers for more products like this that 'go beyond' the one dimensional pages of a book. The popularity of our Scott Adams adventure games is only one symptom of this trend.

Word Processing, Data Base & Spreadsheet for the VIC

Commodore's new software for the VIC-20 also includes "serious" software which can be used with expanded memory to file and store large amounts of information on disk or tape:

—SIMPLICALC, an electronic spreadsheet.

—VICFILE, a data base management program.

—VICWRITER, a high-quality word processor.

"Because the VIC is an introductory computer for many people, we wanted to make sure that our 'serious' programs maintain the 'friendliness' that has become the trademark of that computer, so these new programs are accompanied by easy-to-read instruction guides aimed at the beginning computerist."

He added that several hundred thousand VIC-owners who originally bought their VIC-20's to learn computing or for entertainment, have since become what Tomczyk calls "a new breed of hobbyist."

"A few years ago," he said, "computer hobbyists were electrical engineers who learned how to program in machine code. Most of them were called 'nerds'. Today's hobbyists are more like the people who bought chemistry sets in the 1950's . . . now I doubt whether anyone who owned a chemistry set in 1950 ever thought he could use it to develop a cure for cancer but I'll bet there are quite a few people working on cancer cures right now who used to own chemistry sets."

"Maybe a teenager who's just learning how to type, or a colorful senior citizen writing her memoirs, will take the VICWRITER and write a great book, a book that might not be written if it had to be written in longhand or if the 500-page manuscript had to be retyped or rewritten a dozen times. Computers make those kinds of activities easy, by speeding up the process of creation and discovery. That's the kind of end result we're striving for in our new software . . . creation and discovery."

The Commodore VIC-20 personal computer is the best-selling computer in the United States. The computer, which now retails for under $200, was originally introduced in 1981 as the first color computer priced under $300. The VIC-20 has become known as the most "user friendly" computer for first-time computer owners, and is also the least expensive computer system to expand in terms of memory and peripherals. □

Three New Low Cost Systems

(6 Jan. 83—New York, NY)—Mr. Irving Gould, Chairman of the Board of Commodore International Limited, in conjunction with Commodore's planned announcements at The Consumer Electronics Show which begins today in Las Vegas, Nevada, announced the following plans by Commodore.

According to Mr. Gould, "Commodore will introduce several new microcomputer systems, a number of new microcomputer peripheral devices, and several new software packages."

Mr. Gould went on to note that "among the microcomputer systems to be introduced are three portable systems, each of which has 64K bytes, or 64,000 characters, of built-in user RAM, or random access memory. In addition, all three systems have built-in 5-inch television display monitors, two of which are in color, as well as one or two built-in floppy disk drives which provide, respectively, 170K bytes or 340K bytes of additional mass storage capacity. All three microcomputer systems will have compatibility with the COMMODORE 64 personal computer as to software and peripherals.

"The price of these machines," added Mr. Gould, "like all Commodore microcomputers, will be substantially below any comparable product now on the market. Each system, depending upon its configuration, is expected to retail from $995 for a system with a built-in 5-inch monochrome display monitor and single disk drive to $1,495 for a system with a built-in 5-inch color display monitor and dual disk drives. Initial shipments are expected to commence in approximately 90-120 days."

Mr. Gould also noted that "as a result of the extraordinary demand for the $595 COMMODORE 64 personal computer, the company is expanding its channels of distribution for this revolutionary personal computer to include several of the largest mass merchandisers in the world, and is simultaneously beginning initial shipments of its new P500 series microcomputer, to be named the COMMODORE 128, to its regular computer dealer network. The COMMODORE 128 which has 128K bytes, or 128,000 characters of built-in user memory, will have a suggested retail selling price of $795." □

News Releases

First Full Year Warranty Offered by Leading Edge Products

For the first time in the history of the microcomputer industry, a full year warranty on computer printers is being offered to end users. Making the offer on all C. Itoh printers is Leading Edge Products of Canton, Massachusetts, who are the exclusive U.S. marketers and distributors of the C. Itoh line of printers.

This is the only full year warranty offered in the U.S. on printers and it covers the entire C. Itoh line, including the Starwriter, Prowriter, Prowriter 2 and Printmaster. The warranty can be applied to all parts and service required resulting from defects in manufacturing.

Because the industry standard for printer warranties is 90 days, the extended warranty is regarded as an appropriate reflection of the quality and reliability of the C. Itoh machines according to Leading Edge® .

"This revolutionary, one year warranty represents a real savings to end users," said Bill Sellers, Vice President of Market Research at Leading Edge Products. "This is one item that will not have to be covered by service agreements that typically costs $90 or more per year."

"More than that, however," Sellers continued, "It is our statement to the consumer about the reliability of this product. It says that we know the C. Itoh line of printers is the highest quality product available in the market today."

C. Itoh printers are widely used in home, education and small business settings as well as in industrial fields. They are currently available in more than 8,000 computer retail outlets nationwide.

Founded in 1980 as a distributor and marketer of state-of-the-art computer peripherals, Leading Edge currently employs more than 250 people.

Leading Edge markets and distributes its proprietary product, Elephant Memory Systems® , as well as a full line of microcomputer peripheral products.

For further information on the warranty and other products offered by Leading Edge, call 1-800-343-6833, or in Massachusetts, call collect (617) 828-8150 or write to Leading Edge Products, 225 Turnpike Street, Canton, MA 02021.□

The Market

Commodore expects that many students and others now using portable calculators will begin using handheld computers at an increasing rate. Owners of larger computer systems like the Commodore 64 will also want to acquire a handheld computer as a portable extension of their larger computer system.

When asked about the market for handheld computers, Commodore marketing personnel responded by asking the rhetorical question: "Why buy a programmable calculator when you can buy a handheld computer for about the same price?"

Commodore Business machines, Inc. (NYSE:CBU) is a vertically-integrated manufacturer of computer products and accessories, semiconductor devices, office furniture and watch components. The company was founded in 1958. Commodore introduced the first self-contained desktop computer (the PET) in 1977. Commodore's MOS Technology subsidiary designs and manufactures semiconductor devices, and is the developer of the 6502 microprocessor which is used in many other computers besides Commodore.□

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VISA

The Skyles Source Connection

by Neil Omvedt
Roseville, MN

In order to telecommunicate, one needs a modem and software for uploading and downloading data. One course of modems and software for the Commodore CBM and PET series is Skyles Electric Works. Skyles sells the Cat and D-Cat modems with interfacing for CMB/PET computers. The Cat modem is an acoustic modem (you place the phone in the modem) while the D-Cat which costs $25 more is a direct connect modem. The list cost of the D-Cat with the communications program and a membership in the Source (normally $100) is $350.

The modems interface to the PET user port rather than to the IEEE port and are provided programs on cassette to provide communications potential.

The programs loaded onto my computer with some difficulty. Since I was experiencing difficulty loading the programs I called the Skyles Electric works over the weekend and requested copies of the programs and was told they would be sent on disk. This was never done but I finally did manage to load the programs to my diskettes the following week. To run the programs is a little bit tedious. First there is apparently a machine language program to load and run. Then you have to make a poke to memory and type a new command. Then the second program must be loaded and run.

The second program is the control program. It first comes up with a series of prompts to set the baud rate (300,1200,600 or 110), select half or full duplex mode, select PET/ASCII character conversion, disable PET graphics, and trap the clear screen character. Once all the options have been set (there are defaults to the most common option), the menu for the program is shown. The menu options include sending from disk to modem, input from modem to disk, input from modem to printer, communicate interactively (the terminal option), list disk directory, view a disk file, print a disk file, and a help command that explains the other options. The most common choice would be to communicate interactively in which case the program operates the PET like a terminal. Another useful option is to send input to a disk file in case you wish to print it (which can then be done offline using the print disk file command).

There is documentation provided for the system, but it is rather skimpy. The first page explains how to hook the system up to the computer and the phone. The documentation then continues on to explain how to use the software and the modem. There is also a listing of the modem program, but not the initial setup program.

As I stated the whole package includes the Source an information utility. Charges for the Source are normally $100 to connect and a minimum of $10 a month. The Source is an information utility which provides electronic mail, text editing, information on the stock market, government, news, sports, travel arrangements, games, and telecomputing in various languages. At the time I first signed on to the Source the service was very sporadic and there were a lot of problems. Also, the Commodore computer doesn't have a control key so it was sometimes hard to break out of various services. Since then the Source has switched to its own computers and things have improved somewhat since most functions require a stop key to break out of.

The Source has two methods of use. One is through direct commands while the other is through a series of menus. The menus are the easiest to use since there is a long series of commands to learn.

Charges for the Source are based on connect time to the system. Regular time costs $18.00 an hour with evenings, weekends and holidays billed at $5.75 an hour (and an even cheaper rate for midnight to 7 am). Also billed is the cost of maintaining files on the Source. Certain Source services such as the Media General stock analysis program are billed at higher rates. These are referred to as Source Plus services. There is $1.00 minimum file charge and a $10.00 minimum total charge each month. □

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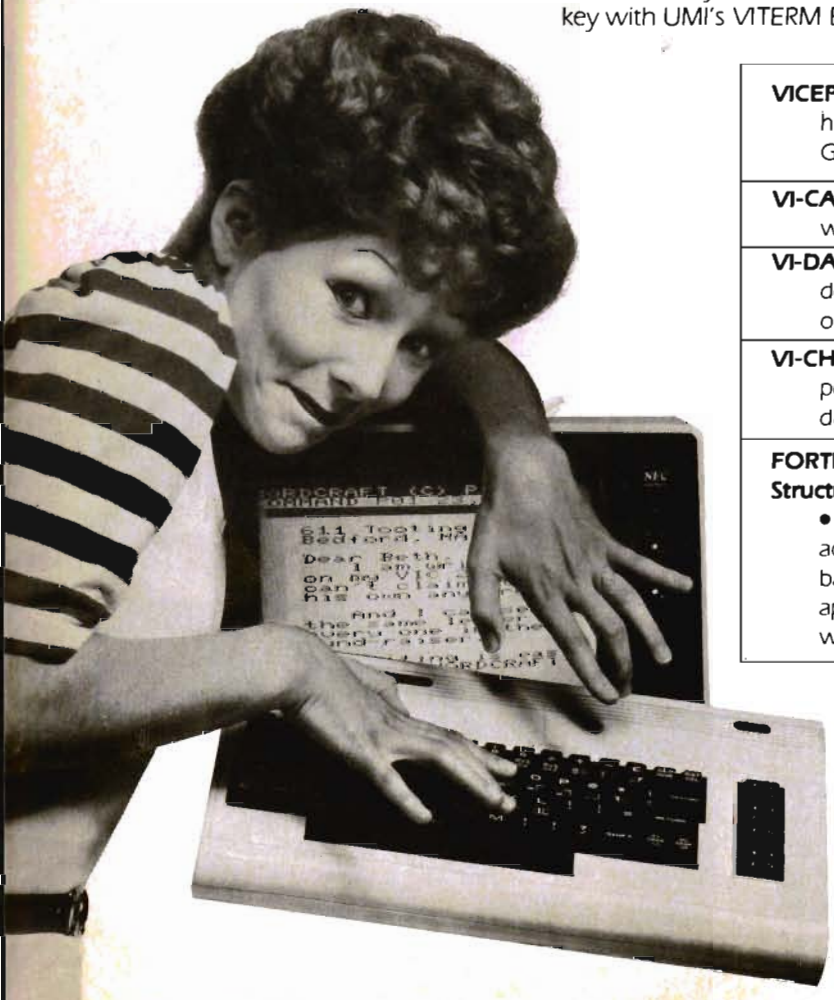

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Product Reviews

C64-IEEE Transparent Interface

Manufacturer:
MSC, Inc.
11105 Shadytrail, Suite 104
Dallas, TX 75299

I have been using the interface between the C64 and a Commodore 2040 disk drive (REV 2A ROMS) for several months. I have found the unit easy to use and reliable.

The interface almost lives up to its name when used with the C64 Basic. The logo, which it prints every time it is activated, is not transparent and will trash a menu or display. Once we know this happens, it is very easy to work around. The interface traps all Basic commands going to device number four and higher. It has also worked very well with an EPSON MX-80 printer that is on the Buss.

At the machine language level the interface becomes so transparent it almost disappears. The manual did not provide any call addresses for the 488 primitives such as TALK and UNTALK, nor were they at their expected places in the KERNAL JUMP TABLE. This means high-level languages or machine language programs that do use the serial primitives will be incompatible with the interface. Also, at the machine language level, there is a large block of code in the $A000 area which needs to be reserved if the interface is going to be used. For me, it would have been much nicer to have this at the top of the $C000 area.

The machine language programmer can work around the above minor defects by generating custom jump tables and relocating the code (most of the larger monitors have disassemblers and relocators for this purpose or a symbolic disassembler can be used).

The interface plugs into the cartridge expansion port of the C64. A cartridge can then be plugged into the interface, so there is no loss of expansion capability. A standard PET-488 cable (not supplied) then connects the interface to the buss. Once you get the heavy 488 cable and expansion hooked up, the C64 will need a good solid surface to call home. This is not a configuration you can hold in your lap.

If you already have 488 drives or your application requires the faster disk speeds, then the MSD interface should be given serious consideration. For about $160 (interface and cost of cable purchased locally) the C64 was on the 488 Buss.□

The C64 Programmer's Reference Guide

Commodore Business Machines, Inc. and Howard W. Sams & Co., Inc.
Price: $19.95
Pages: 486

This book is much more than the name implies. In addition to programming reference material, it contains a large amount of technical data on the primary chips and has a large fold-out schematic at the back of the book.

There are some pleasant surprises such as the color combination table on page 152 and the extensive definitions for the standard KERNAL JUMP TABLE.

The subject index at the back of the book is very useful for quick reference, and has been more than adequate in most cases (NMI is noticeably absent).

On page 25 the book continues the myth that using low line numbers will conserve memory. The line numbers are stored as double-byte unsigned integers, so there will be no conservation by renumbering the program after it is entered as they recommend. Memory conservation can occur DURING the editing process as smaller line numbers take less space on the 40/80 column editing screen.

Overall, the guide is pertinent, useful, readable and usable. If you plan on doing more than minimal Basic/machine language programming, then the guide will be a necessity and a good investment.□

C64-Link: Review

Manufacturer:
Richvale Telecommunications
10610 Bayview Avenue
Richmond Hill, Ontario, Canada
L4C 3N8 (416) 884-4165
Price: $185 (Canadian) plus $10 P&H Optional connectors:
VL-3: Parallel Printer/User Port: $60
VL-4: RS232 Modem/User Port: $60

It is difficult to assess which feature of this device may appeal most to the Commodore-64 owner. Be assured that even one benefit could make this product a "must" for any serious user. But, first of all, let's start at the beginning—what is it?

Description

The C64—LINK is a hardware device about three inches square and ¾ inch thick. It plugs directly into the expansion port, or cartridge port of the C64. The rear of the plug has a PET/CBM edge connector, which has been configured as an IEEE488 port. Inside the cartridge is a ROM with 4K or machine language code (more on its contents later).

Functions

Depending on your particular equipment configuration, you may find

some of these more noteworthy than others:

1. The ROM provides all fifteen Commodore Basic 4.0 standard disk/file handling instructions, plus the disk status variables (DS and DS$). These are implemented with full compatibility to Commodore's existing scheme. Therefore, it is quite likely that programs written in Basic for the 4016/4032/8032 which rely on disk commands, will be compatible in their file handling.

Please note that the additional Basic 4.0 commands do not mean that Commodore Basic 4.0 has been provided: garbage collection and the string variable storage remains the same as with Upgrade ROM.

Any user with a disk drive will benefit tremendously from the added instructions: you do a catalog or check disk status without losing the program in memory.

2. The ROM and the edge connector combine to provide the IEEE488 port necessary to interconnect the C64 to all PET/CBM parallel devices: 2031/4040 8050/8250 and hard disk drives plus Commodore IEEE printers (2022/4022 et. al.). On power-up the system defaults to this IEEE connector. Holding down the COMMODORE key on power-up, shifts the default option to the "SERIAL" devices (1541 disk or 1525 printer) instead.

To me, this is the big plus for the C64-LINK. With two CBM systems already, I couldn't justify the investment for a (painfully-slow) serial disk drive. Dumping to tape to load into the C64, and then reSAVEing the modified version back in to the CBM system is too horrible to consider. I'm not being elitist—just can't bear to see a fully-paid-for disk drive sitting idly by while a tape spins away.

If you already have a CBM type printer and/or disk drive and at least a PET to IEEE cable to connect to the back of the C64, you will use this too.

3. The connection of a "Centronics-standard" parallel printer is done with the optional VL-3 cable. Printers such as the Epson MX80, C. Itoh Starwriter or NEC become usable. In fact, combinations of the PARALLEL printer may be intermixed with either SERIAL or IEEE disk devices, to allow maximum flexibility of operation. Activation of this device is done with the "PARALLEL" command. It may be altered with "IEEE" or "SERIAL" at any time to reconfigure the ports, with no loss of information. The user port connects the C64 to the printer.

4. For those with a standard RS232 modem, the VL-4 adapter is required (optional extra). The user port is again employed, and the "MODEM" command allows the C64 to act as terminal to a bulletin board system or another modem-equipped computer. Escape and Break are supported by the modem software.

5. Also within the ROM is a machine language monitor, which allows display and modification of memory or registers, load and save of memory, execution of ML programs, and exit to Basic. This is Jim Butterfield's TINYMON FOR VIC, adapted for the C64 (no credit acknowledged). The "MONITOR" command calls this routine. Even a budding machine language programmer will find this an essential feature.

6. The ability to share a disk drive and/or printer amongst eight or more C64's is provided. All computers are connected through IEEE to IEEE cables, with one machine connected to the shared drive/printer. This networking feature should prove very attractive to educational users, and may justify the purchases for this purpose alone. Remarkably few restrictions apply when this is in effect: only one person may catalog at a time, and each user must use unique secondary addresses when multiple users are reading or writing files simultaneously.

Comments

A typeset 46-page manual is included in the package. It is very comprehensive and quite readable, giving detailed instructions and diagrams on correctly connecting the system to the C64.

A brief description and example is given for each of the added disk commands. A cross-reference to four publications for thorough discussion of the commands is provided. The table on Page 18 which identifies the source manuals is (oddly) separate from the section which refers to them.

Details on using the monitor, modem, and chain features are also included. The addition of a table of memory usage is a very useful, and often-neglected, benefit. Too few programmers identify key locations, which become important if other programs get connected to the system and suddenly don't work!

Inside the package is a cassette tape with two programs on it. Each has a purpose, and may well be required in certain cases:

When you turn the C64 on, you will notice that only 30719 bytes are available to Basic. What happened to the missing 8K? It turns out that the 4K of code actually consumes this 8K block of memory. If you're not in danger of 'OUT OF MEMORY' with your program, leave everything alone.

The first little program will shift the ML code to a (possibly) vacant 4K of memory starting at address $C000 (49152 in decimal). You then get back your missing 8K for those big programs! You still have the disk commands at your disposal.

There are occasions where neither of the two locations will be acceptable for the program you are using. (The sprite demo with CLYDE and the Christmas demo are two examples I've found). The second ML program on the tape covers this condition. The program moves Basic into RAM and inserts IEEE routines in place of SERIAL into Basic. You surrender the Basic 4.0 disk commands and the ML monitor, but recover all the RAM normally consumed by the C64-LINK. Since I do consider the IEEE access essential, this is a valuable addition to the package.

The manual describes these programs as well, and also tells you how to shut off the C64-LINK entirely. This is given as a direct statement (one line, with seven instructions). I would recommend that you type this in as a program and save it on disk. This will eliminate the certainty(?) of a typo when you come to use it. Of course you would lose whatever is in memory this way. You judge for yourself, though I haven't had any reason to disconnect the C64-LINK so far.

Recommendations

My copy of C64-LINK is a review copy, borrowed from Peter Smith of Richvale Communications. He will not be getting this one back. As program librarian for the 3200-plus members of the Toronto Pet User's Group, this device is essential for me. The capability for quick review, modification and cataloging the flood of public-domain software is provided by the C64-LINK.

The unit works as advertised, and I believe it can represent excellent value for a wide range of C64 users. The IEEE connection and Basic 4.0 commands are my main reasons for needing it. The networking, parallel printer and modem interface may be more important to you.

Postscript

This review was originally to describe the V-LINK cartridge for the VIC-20. It is a functionally similar device, but is now being redesigned by Richvale to work totally through the expansion port rather than partly through the user port. The unit I have is of the earlier design, and consists of a standard cartridge, which added RAM (3K, 8K and 16K versions available). The ROM with the added code is fitted inside the cartridge. Connection to IEEE, parallel printer or modem is effected with an (extra cost) adapter(s) plugging into the user port. Hence, no IEEE disk can be combined with a parallel printer simultaneously. No networking provision is built-in. There are two bugs in the code: catalog with no disk connected hangs the system instead of giving an error message, and some of the Basic 4.0 statements don't work properly after IF/THEN. (Both of these were corrected in the C64 version). I'd suggest waiting until the new version is available. As of this writing, I do not know the release date for this one.□

Paperclip Word Processor: Review

by David A. Hook
Ontario, Canada

Author: Steven Douglas
Available from:
Batteries Included
71 McCaul Street
TORONTO, Ontario, CANADA
M5T 2X1
(416) 596-1405
Price: $150 Canadian (advertised at $125 U.S.)

Description

PaperClip is a new word processor program for PET/CBM Basic 4.0 computers. The same program functions with both 40- and 80-column computers. Text may be saved to both tape and disk, though serious users of a word processor will undoubtedly have disk storage available. The attraction of tape storage will not be lost in a school environment where limited disk availability is common. The program is supplied on disk: both 8050 and 4040 disk formats are available. Additionally there is a ROM with active code: this is to be inserted into the $A000 socket inside the computer.

A version has just been released for the Commodore-64. The author recently indicated that a separate SuperPet version is nearing completion. This one will use the 64K of bank-switched memory to give a huge text area.

Features

A review cannot give the full extent of the features that this program provides. It would require 99 pages (as per the instruction manual) to cover the ground adequately. I have worked with all the WordPro versions to 4+, and PaperClip has so much more included. To cite an example: I made notes on just the added functions and how they are handled. It took five full handwritten pages!

Please excuse the lack of objectivity in this review. It is difficult to find any shortcomings worthy of mentioning. The enthusiasm I feel for PaperClip is heightened by the most outstanding feature of all: its PRICE! To offer such a program at a price comparable to Word Pro 4+ would be quite reasonable. To provide this at one-third the price is astonishing.

In order to mention even the basics, I'm going to presume the reader has a fairly good idea what a word processor is and does. I also must presume a good knowledge of how the WordPro series functions. Most readers will have had some such experience, and the behaviour of PaperClip is very, very similar to the user. So here we go:

1. WordPro compatibility—Don't feel like you have to junk all those files that you have written in WordPro 3 or 4 format. They load properly into PaperClip and you may immediately edit them to your heart's content. More important is the fact that the syntax of all the embedded format commands is identical to WordPro. (All except the "ma", margin release, command anyway. It requires a "+" or "-" offset value). This common syntax means that you can probably output them without a single change to the text. This was a huge relief for me on two counts: I wouldn't have to keep switching back to WordPro to use the old text files, and I had a lot fewer new things to absorb.

2. Horizontal scrolling—Even if you have a 40-column machine, you can set a text width of 80-columns (or up to 126-columns). The text will scroll horizontally as it nears the edge of the screen. You can now do a video output (to the screen) watching all the format commands in effect. This preview feature shows the same output that the printer would use: inserting paging, line-spacing, margins, headers and footers, centering and highlighting any underlined or enhanced text. This video output mode is also available in WordPro 4 versions. With a 40-column machine, no WordPro feature includes this handy mode—lots of paper gets chewed up with the trial-and-error method. With PaperClip on a 40-column you only see the left-most 40-columns, but it is still a terrific paper saver. The horizontal scrolling and resetting of text width makes it so much easier to enter many columns of numbers. Have you ever tried setting 80-columns worth of tabs on a 40-column computer? The tabs wrap-around and make for very confusing entry. Even with an 80-column machine, resetting the width for a wide printer gives the same benefits of non-overlapping tabs.

3. Disk Directory—One of my greatest annoyances with WordPro

has been the risk of losing an evening's work when asking for a disk directory. I usually was careful to do this in extra-text. Both my wife and I have lost hours with this goof (I know that WordPro Plus versions give you a confirming second chance, but one does get a little too hasty even with this warning). Hallelujah, you don't lose your text file when you do a directory in PaperClip. The directory is displayed on the screen, but not stored in memory. This still permits you to "read the screen" at the cursor position to eliminate the drudgery of typing in file names for loads or disk commands. On this latter point, you are allowed full cursor editing of this phrase, not just the delete key of WordPro.

4. Text Phrases—PaperClip offers a much more comprehensive ability to define blocks of text. Both PaperClip and WordPro allow definition of a "range" of text, which may be moved, copied or deleted. This range must consist of full lines, i.e. no starting part way through a line (at a logical sentence start or end). WordPro can define words or sentences, but only for deletion purposes. PaperClip allows the phrases and sentences to be moved or copied elsewhere in text. This range definition is much more convenient. It even includes a single-key "find the end of the sentence for me" feature.

5. Find/Search and Replace—A wild-card character (the backslash) will match any character in the text string. This may be used in both the find and the replace modes. Both leading and trailing spaces are significant in the search string too. This makes it easier to find words such as "the" without getting "there" as well. You may do up to five simultaneous search-and-replaces of different strings with both local and global modes. There is also the option of a query before replacement, which is a great relief for the careless who goofed in defining the strings (Yes, I've been guilty and paid the price of manual restoration with WordPro). A notable absence in PaperClip is the lack of the "absolute" feature of WordPro. PaperClip treats "The" and "the" as entirely different strings.

6. Printer Support—Other word processors must limit the number of printers they support because of the wide variation in their special commands to activate special print modes. PaperClip has a completely different approach: a separate "printer file" is defined. When you are ready to print your text, the program asks if you wish to load a special printer file. There are twenty such printer files on the program disk. All the common printers have been represented. (A printer set-up program is included on the disk so you may provide for all the special codes of your printer). It was quite a surprise to see my friction-feed 2023 printer doing underline and overstriking after all these years. Similarly 2022/4022s can do superscripts and subscripts, and Epson Type IIIs will do italics too. As the manual states, "this routine allows the user to use the best features which their printer has to offer." For both the video and the printer output, the count of the number of words in the text is displayed on the top line.

7. Text Load/Save—Two modes are supported: the regular Program files which are only usable with disk storage, and a Sequential file which can go to tape or disk.

As mentioned previously, the Program files are WordPro compatible. PaperClip has chosen to store both the horizontal text width and the tab stops as the first few characters in the file. Having to re-establish tabs has been a bit of an annoyance with WordPro. Storing of the line lengths makes files more transportable between 40- and 80-column machines, but has hazard as well: redefinition of line width requires clearing of the text from memory. (Save it before changing width). The files saved with this command will now not format correctly when loaded by WordPro. The manual does not tell you how to "fix" this: if you do a "global file copy" you get prompted asking if the tabs and width should be stored too. A negative response will save a file that is backwards compatible for WordPro.

The Sequential file mode is required for tape saves and loads. A convenient Verify command is included, mainly for tape users to get some assurance that the tape save was a good one. Its second purpose is to allow the common trick of using Verify to cue up the tape to the end of the last "saved" file. The format of the characters saved is different from the Program mode. The files are in PET ASCII, rather than PET screen code. The ASCII format is a more standard code for interaction with other programs (data-base or mailing lists) that expect the data in this format. These files are also used for storage/recovery of variable blocks of information for form letters, in the same way that the extra-text area is used in WordPro. When changing line lengths (see above), you can use this mode to temporarily store the file, since it doesn't keep the width or the tab information in the file.

While the program loads, it is displayed to the screen, unlike WordPro which requires you to scroll through the text to see what you've got. When saving a file the program updates the line number indicator to show that something is happening. You may save a specific line range as well as the whole text file, and can append to the current file in memory, without erasing all the current file. A very handy feature is the ability to move a chunk of text from one file to another when you are running out of space in the present one. This technique is particularly well described in the manual.

8. Column Manipulation—A big plus to PaperClip for this addition. A columnar area can be framed with the cursor keys, and manipulated in a wide variety of ways. You can add, delete, move, insert and copy columns in the matrix almost at will. A table of information can be massaged to give just the right presentation to the date. You may do column or row addition, using exact decimal arithmetic and a defined degree and decimal precision, including rounding. This seems like the place to mention a unique system of numeric tabs that does not get mixed up when entering columns of numbers. On a given line, there may be some non-printing characters that would make it very difficult to keep the

columns correctly aligned. The numeric tabs in PaperClip work by considering the "printable" characters when deciding where to put the decimal point (on the screen). Don't worry, it will all work out OK in the end, despite the nonsense that appears on the screen. In Numeric Mode, parentheses, dollar signs and minus or plus signs may be part of the numbers entered.

9. Sorting—When the table is just right, why not do an alphanumeric sort on it? That's right, multi-field sorting in your word processor. Up to 16 fields may be permitted, with your choice of field delimiter and whether leading spaces are significant. You may sort in ascending or descending order, using your choice of hierarchy for the sub-sort. A mailing list file could be loaded in and sorted by postal code or whatever you choose. This feature is very impressive and usually found only on the big, stand-alone word processors (until now!).

10. Table of Contents—Put a special format command in text for each heading of significance and PaperClip will write a sequential file with the titles and the page numbers where they appear. This can make the production of a table of contents page quite painless: just reload the file PaperClip produced, add some formatting commands to this and there is your table of contents page. I could have used this a couple of times already.

11. Arbiter Interface—The program interacts with Batteries Included peripheral-sharing system. This may be toggled on and off, even if the Arbiter system software is installed. Other wordprocessors may have to be reworked to be compatible with some of these systems.

Summary

The manual is 112 pages long and has a reasonably friendly style. There is an Addenda file on the program disk which describes some features added since it went to press. A WordPro user can probably get through it on his own, but the description of the so-called standard features is rather brief. Thankfully, there is plenty of information on the how-tos and whys for the novel features. I believe that the program's author wrote the current edition—not usually the best choice. I would rate it as better-than-average. There are three appendices: control functions, formatting directives and error messages.

There is one omission in the package that is of great benefit to WordPro users: the quick reference guide which can be left on the deck of the PET/CBM. All of the control functions and embedded format commands are organized for convenient reference. Because of the multitude of PaperClip features this should be a priority item.

Because of the similarity to WordPro commands, PaperClip was quite easy to adapt to. The different Control sequences were kind of a mixed-blessing—I had to "unlearn" WordPro's before the PaperClip ones became more familiar. (Many of these Control sequences are the same as with WordPro).

Continued on page 72

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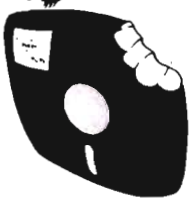

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Why Didn't I Think of That?

by Howard Rotenberg
Toronto, Canada

Editor's Note: Due to an error in February's issue, the listing for "Why Didn't I Think of That?" is being reprinted in this issue. It is not our practice to continually reprint articles and we appreciate your understanding.

Have you ever been using a routine for a long time assuming that it was common knowledge? I have met a lot of people using useful routines that I wished that I had in my little bag of tricks. The funny thing about them is that they are usually so simple the question arises, Why didn't I think of that? These were the exact words that a friend of mine used the other day that inspired me to pass on these few routines. NOTE: Usually he is the one to figure them out first.

The routine that he spoke about is the one I will present first. This small routine may be used in a program to see if the printer is turned on before trying to print text. (See program 1)

I have used the word "home" to represent the home key on the keyboard. As you see, the routine is simple and may be easily put into any program. The crucial lines are 15 and 20. After the printer is opened, we do a simple print#4. Line 20 checks the status at this point and it should be zero if the printer is on. If it is not, it looks back and tries again. The program loops until the printer is finally turned on in which case you are graciously thanked. You may, of course put in any type of error detection you wish (ie: flashing messages), however, I chose to keep it simple for the example. One strange occurence was that we tried the routine with the IEEE cable disconnected expecting to see a DEVICE NOT PRESENT error, however, we did not. This one I will let you figure out.

A short but useful routine to read sequential files follows. I have used a small machine language routine to read the file and will explain exactly what it does and its BASIC equivalent.

```
10 FOR J = 0 TO 22
20 READ A
30 POKE 634 + J,A
40 NEXT J
50 INPUT "FILENAME";F$
60 DOPEN#1,(F$)
70 SYS 634
80 DCLOSE
90 GOTO 50
95 DATA 162, 1, 32, 198, 255, 32,
   228, 255, 32
97 DATA 210, 255, 166, 150, 208,
   2, 240, 244
99 DATA 162, 1, 32, 166, 242, 96
```

Line 70 jumps to the machine language routine loaded by the first four lines. The BASIC equivalent to this line is:

```
70 GET #1,A$: PRINT A$;: IF
   ST <> 64 GOTO 70
```

The main reason for using the machine language is of course the speed at which it will read and display the information. You may easily substitute the BASIC line 70 to see the difference yourself. Since the routine is just loaded as data statements that don't mean too much to a lot of users, program 2 will show exactly what the routine is.

The two JSR instructions ($FFC6 and $F2A6) are ROM dependent for BASIC 4. The other routines are Kernal routines that may be used on all Commodore computers. To find the proper routines for the VIC 20 or the Commodore 64, you may just look in any memory map. I have the maps but without the computers to test it on I would rather not print the addresses in case of error.

Another routine I have found many opportunities to use is one that takes TI$ and converts it into a regular everyday 12 hour clock. It even displays AM or PM. It's not that I am opposed to the 24 hour military clock but unless you are in the service or a hospital (hospitals like to use the 24 hour clock), the more familiar 12 hour clock seems more friendly. (See program 3)

I have included a return statement in line 70 since this routine lends itself to be called as a subroutine. I have found that displaying the time in the more common way adds less confusion to an end user of one of my programs.

I imagine I could go on for a long time sharing these small routines as I am sure we all could. Rather than doing that I would like to end off with just a few very small but extremely useful ones that I find very handy.

The version of MICROSOFT BASIC that comes on the Commodore computers lacks an extremely useful logical operation. They have included the AND, OR and NOT function (even though the NOT function is NOT what you would expect it to be), however, unless you get into machine code you do not have an exclusive or function. The truth table for this function is as follows:

```
0:0 = 0
0:1 = 1
1:0 = 1
1:1 = 0
```

To EOR or as some languages present it (XOR) the variable A with B the following may be done: ((A) AND (NOT (B))) OR ((B) AND (NOT(A)))

Next we will round off the number (N) to (D) decimal places:

```
10 INPUT D
20 INPUT N
30 N = INT(N * 10 ! D + .5)/10 ! D
40 PRINT N
```

I have used an exclamation mark in-

stead of the exponent or up arrow sign in line ten, since my method of writing this text does not include that character. If you use the routine, please use the proper key as I can guarantee you that the exclamation mark will not work.

In an earlier example I used a basic loader to poke a small machine subroutine into memory. These numbers, however, had to be converted to decimal first so here are two one liners to do conversions for us. First we submit the routine where our hex number is in the variable L$, and is returned in L as a decimal number. (See program 4)

Now we submit the variable L to this decimal to hex routine. (See program 5)

The two conversion routines may be put into one line, however, I decided for the sake of clarity to display them as two.

Lastly, if you do not want to convert a hex number to decimal but prefer to list it in data statements as hex and still poke it into memory, then the final routine is for you. (See program 6)

The data statements contained the same sequential file reading routine that I used earlier.

Conclusion

We over the years seem to acquire a number of subroutines that we like to use in our programs. Some of course are much more difficult than others, however, even if we don't fully understand them, with the proper instructions, we may all benefit from them. There is a limit on the number of ways that one can implement the same function using any one given premise. I am sure that there are a lot of routines out there being used every day that do the same as the few I have shown. I hope mine will be of use to some of the readers and if so, please let us in on your tricks that you assume that everyone else already knows. If you do, I am sure that just like that friend and myself, a lot more people out there will benefit greatly while saying: "Why didn't I think of that?"

Program 1

```
5 REM *** TEST AND WAIT FOR PRINTER ***
10 OPEN 4,4
15 PRINT#4
20 IF ST <> 0 THEN PRINT "^HOME^TURN ON PRINTER": GOTO 15
30 PRINT "THANKYOU"
40 REM *** THE REST OF THE PROGRAM ***
```

Program 2

```
          * = $027A          ;START OF ML (634 DECIMAL)
          LDX #$01           ;GET THE FILE NUMBER
          JSR $FFC6          ;SET THE INPUT DEVICE
GETCH     JSR $FFE4          ;GET A CHARACTER
          JSR $FFD2          ;WRITE ONE CHARACTER
          LDX $96            ;GET THE STATUS VALUE (ST)
          BNE CLOSE          ;IF NOT ZERO THEN GOTO END OF ROUTINE
          BEQ GETCH          ;GO BACK FOR ANOTHER CHARACTER
CLOSE     LDX #$01           ;GET THE FILE NUMBER AGAIN
          JSR $F2A6          ;CLEAR THE CHANNEL
          RTS                ;BACK TO BASIC
          .END
```

Program 3

```
10 INPUT "TIME";TI$

20 OI$=""

30 IFVAL(LEFT$(TI$,2))=12ANDVAL
   (MID$(TI$,5,2))>=1GOTO80

40 LK$=" AM." :IFVAL(LEFT$(TI$,2))<=9THENOI$=
   MID$(TI$,2,1):GOTO60

50 OI$=MID$(TI$,1,2)

60 OI$=OI$+":"+MID$(TI$,3,2)+LK$

70 PRINT"THE TIME IS "OI$: RETURN

80 IFVAL(LEFT$(TI$,2))=12THENOI$=LEFT$(TI$,2)
   :LK$=" PM." :GOTO60

90 OI$=STR$(VAL(LEFT$(TI$,2))-12):LK$=" PM."
   :GOTO60
```

Program 4

```
10 L=0:FORJ=1TO4:LX=ASC(L$):LX=LX-48+
   (LX>64)*7

20 L$=MID$(L$,2):L=16*L+LX:NEXT:PRINTL
```

Program 5

```
10 L=L/4096:FORJ=1TO4:LX=L:L$=CHR$
   (48+LX-(LX>9)*7)

20 PRINTL$;:L=16*(L-LX):NEXT
```

Program 6

```
10 FOR J = 634 TO 656

20 READ H$:M$=LEFT$(H$,1):L$=RIGHT$(H$,1)

30 POKE J,(ASC(M$)-48+((M$>"9")*7))*16+ASC
   (L$)-48+((L$>"9")*7))

40 NEXT J

50 DATA A2,01,20,C6,FF,20,E4,FF,20,D2,FF

60 DATA A6,96,D0,02,F0,F4,A2,01,20,A6,F2,60
```

Video Vermin

Continued from page 40

Vic. I turned my set on, and started to play Video Vermin, the Centipede type arcade game by UMI. Before I realized it I found myself in the midst of a large infestation of snails, butterflies, beetles, fleas and ants. I was trying diligently to kill them but to my dismay they just sprouted into mushrooms. It seemed as though my garden would never flourish.

Video Vermin is a fast paced intense arcade game. Your garden is being attacked by vermin, and as you shoot them they sprout into mushrooms which rain down on your garden. You begin the game with three gardners and with each 10,000 points you are awarded an extra man. The highest score is saved from game to game, and as you improve your aim the skill level increases automatically, so it's a constant battle to keep ahead.

Video Vermin is a fantastic Centipede type arcade game sold by UMI, with the highest arcade quality features. The sound is superb and the graphics are so excellent that I found myself reaching for the bug spray more than once.

I recommend Video Vermin to anyone who loves fast action, great sound and realistic graphics. All you'll need to play this great game is a VIC-20, one joystick, a fast hand, and a cool head!

Debbie Gabbard

Game Reviews

Annihilator

Victory Software
2027-A S.J. Russell Circle
Elkins Park, PA 19117
Format: Cassette, joystick required
Price: $9.95
System: VIC-20
Language: machine
Age Level: 12 and up

Annihilator is a defender-type space game. It is a fast moving game where you defend your planet against invading aliens. You have three defending ships and for every 10,000 points you score you get an additional ship. Occassionally a fuel depot will appear on the bottom of the screen. Docking with it will earn you 500 points. Shooting an asteroid is worth 1000 points. The aliens come from all directions and surround you. One of my sons scored 35,000 points, but his reflexes are quicker than those of a fast-draw contestant at a gun show! Quick reflexes increase your score. This is a no-win game, but you can better your score each game.

Rating: Very good action game. □

Adventure Pack 1

Consists of three games:
Moon Base Alpha
Big Bad Wolf
Computer Adventure
Victory Software
2027-A S.J. Russell Circle
Elkins Park, PA 19117
Format: Cassette, keyboard
Price: $14.95
System: VIC-20

Summary: There are three games as listed above. However, we could not get Computer Adventure to function so cannot report on it.

Age Level: At least high school age
Type of Game: Word games, no graphics □

Big Bad Wolf

There is a feeling of impending crisis. A big, bad wolf is coming toward your house. He is only 590 yards away. He is coming to gobble you up! And he is getting closer. You must command the computer as it asks you, "what do you want me to do?" You'd better come up with some fast, accurate ideas to thwart the wolf's plan or you'll end up as wolf bait! As he comes closer to your front door and the computer continues to ask "what do you want me to do" your mind must race for solutions. Your trusty VIC-20 computer will save you if you will just tell it what to do! By the time you finally conquer the wolf, if you do, you will have lived out a very fun and exciting hour. □

Moon Base Alpha

A comet is racing toward your base, a station in outer space. You must destroy this comet before it destroys you. But that's easier said than done! You have a missile which can obliterate the comet—that is if all systems at your base are "go." But you find your missile control computer isn't on line, there is a dangerous virus in the lab which threatens to destroy you. The comet increases its speed as it approaches your base. You must very quickly overcome your numerous problems and launch your defensive missile or the comet will wipe out your base. An impending sense of urgency makes Moon Base Alpha a fascinating and captivating new computer game.

Rating: Very good—both games. □

Grave Robbers

Victory Software
2027-A S.J. Russell Circle
Elkins Park, PA 19117
Format: Cassette, keyboard
Price: $14.95
System: VIC-20
Summary: First graphic adventure for VIC-20
Age Level: At least high school age
Solving Time: 6 to 8 hours

Beware of the Dangers in the Cemetery!

It might not seem too difficult or scary working your way through a cemetery; yet there are obstacles to overcome. Wait until you meet the vicious dog—and try to get past him! If and when you get by him, breathing a sigh of relief, you are confronted by an unmoveable tombstone which you must get by—or over—or under! When and if you succeed you feel you are well on your way to obtaining the treasure. But whoa. Not so fast. You come to a tomb where the treasure supposedly is hidden and you must search four different levels to find it. By this time, you are so engrossed you wonder where the time has gone! Pretty soon, if you're lucky and smart and use the right commands, you will end up finding the treasure.

Our family found this a very fun and exciting new game. However, we were slowed down when we tried to use too much deductive reasoning to solve the puzzle. You must look for the obvious! Once we discovered this secret it became much easier.

In this unusual game you play the role of a character in an unknown environment. Through the computer you control the character and try to solve

the mystery with plain English statements like "open the gate," or "get the key." The computer considers the first word the verb and the last word the noun. It also only looks at the first two letters of each word. Therefore, "op ga" means the same as "open the gate."

Rating: Very good. □

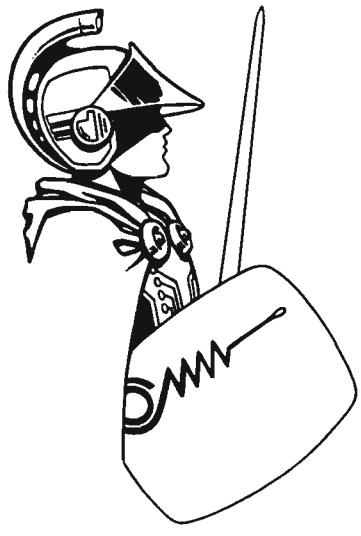
Kongo Kong

Victory Software
2027-A S.J. Russell Circle
Elkins Park, PA 19117
Format: Cassette, use joystick or keyboard
Price: $19.95
System: VIC-20
Language: Partial machine
Age Level: 12 and up

The object of Kongo Kong is to climb ladders, avoid barrels being rolled down by a crazy ape, and rescue a fair damsel. This game is similar to Donkey Kong, the arcade game, but is only one level.

This is a fun and fast paced game. At the top of the screen is a damsel waiting to be rescued. You are at the bottom of the screen and must advance five levels up a series of ladders while a crazy ape near the damsel rolls barrels down toward you. You must avoid being smashed by a barrel. For each barrel you jump over you receive a score. You get three tries to reach the damsel.

Rating: Fair to good. □



Two Winners from UMI

by Tim Parker
Ontario, Canada

United Microware Industries, one of the first companies to offer cartridge games for the VIC-20, has racked up a surprising number of successes. Two of their more popular games are "Spiders of Mars" and "Amok."

Spiders of Mars is an arcade game which allows the player to control a fast moving "Martian Space Fly." The fly is moved about the VIC-20 screen by means of either keyboard or joystick (the latter is definitely preferable), and its mission in life is to destroy various types of nasties that wander its way. To help do this, an unlimited supply of "laser death darts" is available. These will be emitted from the fly as fast as you can hit the fire button (or space bar).

The nasties come in several forms. Martian Spiders descend from the top of the screen suspended at the end of a web's thread. If a spider succeeds in reaching the bottom of the screen, it sits there and occasionally slings a thread vertically. If the fly wanders into the thread, or is hit by it, the fly loses its life. The spider can be destroyed when it is descending by hitting either the spider itself or its thread. The spider then falls to its doom. If it makes it to the ground, however, it cannot be destroyed. The vertical threads it shoots upwards can be eliminated by a hit from the darts, but a fresh thread rapidly follows.

Saturnian Bats are (not surprisingly) bats that follow the hapless fly around, homing in on it. A bat's touch is lethal. They are destroyed by a direct hit with a dart.

Plutonian Dragonflies are dangerous little critters. They drop smart bombs that head unerringly towards the hapless fly. The dragonflies are killed by darts, but the bombs are not. They do, however, have a limited lifetime, and wink out after several seconds.

Jovian Hornets round out the cast. These are the deadliest of the bunch. They shoot very rapid darts at the fly, which are almost always unerringly accurate. Most players do not have time to dodge these darts.

The game begins with two each hornets, dragonflies and bats on the first level, and a random number of spiders dropping at intervals. The screen wraps around, with a landscape several times the screen's width presented, similar to "Defender." As the levels are cleared, and the player progresses, the number of enemies increases, as does their point value.

Bonus flies are awarded at intervals.

Graphically, the game is very well designed. Authored by Peter Fokos, who has other excellent games, it

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taxes the VIC-20's limits. The animation is superbly done, with smooth scrolling of the game's participants. The fly beats its wings rapidly, and the spider waggles its legs in a manner that rivals arcade games. The colors are bold, and if a suitable source is provided, they give a stunning display of color.

The sound is adequate, although somewhat elemental. An opening music piece (Bach's Tocatta and Fugue in D Minor) begins to weary after a few playings, and the sound of the fly firing darts is reminiscent of first generation arcade games. The sound could certainly be improved to take full advantage of the VIC's capabilities, but this is not a serious deficiency.

The game plays very well, and is addictive. Once the tricks of the game are mastered (check the directions each of the critters flies in, and clobbers the hornets) the levels rapidly mount up. Equipped with 256 skill levels, the game will tax even the best joystick pilot. (I take UMI's word for 256 levels: I've only managed 20 odd!)

The function keys on the right of the VIC-20 are used to control the game's difficulty, and allows resetting of the game. The game can also be paused and restarted by pushing the "P" key: a very handy feature for when the phone rings, or the fire button thumb gets sore.

In summary, this game is a winner, and is sure to be one of the most popular games in a library. It comes packaged in a cartridge that plugs in the back of the VIC, and has complete instruction sheets that tell all there is to know. Definitely recommended!

Amok is a game by Roger Merritt that resembles the arcade game Berserk. A hapless human is placed in an endless maze of rooms inhabited by robots bent on destruction. The walls are also deadly to the player.

The game is controlled by joystick or keyboard. Points are awarded for each robot destroyed. (They come in four colors, each with a different point value.) One extra man is available, and bonus points are awarded for clearing several levels.

In play, this game is not quite as well designed as Spiders of Mars. The animation is jerky, and the sound is very rudimentary. This, however, is directly due to the game being written in BASIC instead of machine language. As a BASIC program, it does rather well and plays at a satisfactory speed.

A little variety would go a long way in improving Amok, as would more elaborate sound and graphics. As it stands, Amok will still be popular. The Berserk theme has appeared in several incarnations for the VIC, and this is one of the front contenders. On playtesting, however, most people seem to tire after a few games. But this is indicative of the subject, not UMI's version.

Amok is available on both cassette tape and cartridge to simplify loading The game will appeal most to the younger crowd: older audiences will look for something with more sophistication. □

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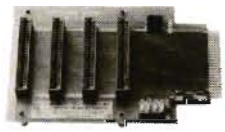

4 Slot for the 64. Toggle switches and reset switch.
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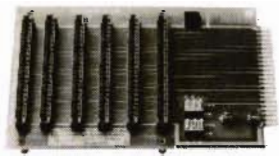

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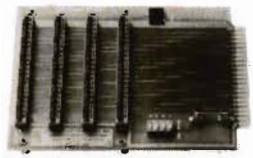

4 Slot for the VIC. Toggle switches and reset switch.
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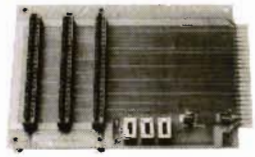

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Given here, in zip code order, is a partial list of the Charter Dealers who will be carrying the COMMANDER. We will provide updates for this list in following issues as a service to provide our readers with a local source at which they will find information, hardware, or software for their Commodore Computers.

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(809) 781-0350
Manager-Owner: Julio C. Martinez

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Manager-Owner: Tom Mulken, Jr.

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Salem, MA 01970
(617) 741-1724
Manager-Owner: Tim Bush

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Norwood, MA 02062
(617) 769-6867
Manager-Owner: Steve Gavrilles

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International Computer Services
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(401) 273-1001
Manager-Owner: Steve Lablanc

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Compu-Craft, Inc.
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Keene, NH 03431
(603) 357-3901
Manager-Owner: Richard Bishop

Echo Consulting Services
PO Box 1199
Conway, NH 03818
(603) 447-5455
Manager-Owner: George Epotien

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Maine Micro Systems, Inc.
55 Center Street
Auburn, ME 04210
(207) 786-0696
Manager: Nancy Lecompte

Vermont

Computeam
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S. Burlington, VT 05401
(802) 862-2802
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Winoski, VT 05404
Manager-Owner: Bob Howe

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(203) 342-2747
Manager-Owner: Bob Stasko

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Micro Computer Services
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Warren, NJ 07060
(201) 561-3111
Manager-Owner: Jerry Prevete

Computer Workshop
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Cherry Hill, NJ 07013
(609) 665-4404
Manager-Owner: Charles Kolbe

Computerability, Inc.
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(201) 835-0688
Manager-Owner: Dennis Mull

Wayne Computer Store
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Wayne, NJ 07470
(201) 628-7318
Manager-Owner: Rick Delti

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147 N. Kinderkamack Road
Montvale, NJ 07645
(201) 391-0931
Manager-Owner: C.M. Hatfield

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1200 Haddenfield Road
Cherry Hill, NJ 08034
(609) 665-4404
Manager-Owner: Chris Kolbe

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(609) 953-1200
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Manager-Owner: Paul Hammer

BB/The Computer Store
216 Scotch Road
Trenton, NJ 08628
(609)883-2050
Manager-Owner: Barry Brown

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Computer Center
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New York, NY 10016
Manager-Owner: Elliot Robinowigtz

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New York, NY 10028
Manager-Owner: Leigh Goldstein

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90 John Street
New York, NY 10038
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Manager-Owner: Frances Banks

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Middletown, NY 10940
Manager-Owner: Kate Honders

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World Wide Electronics Dist.
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(516) 549-8833

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Manager-Owner: James and Kathy Lyons

Ray's Supply
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Plattsburgh, NY 12901
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Manager-Owner: Ed Eichenwald

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Manager-Owner: Vicki Knick

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Charleston, WV 25301
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PaperClip Word Processor

Continued from page 58

As stated at the outset, this is a real winner. The price of word processing has become incredibly reasonable. Its usablity on any Basic 4.0 PET/CBM may potentially save you a bundle if you suddenly upgrade to a newer machine, or an 80-column one.

My thanks to Alan Krofchick for providing me with a review copy of the program. (Version 2.83 is the one I used). Batteries Included plan to provide continuing support to customers, and encourages users to submit printer files for any other printers they use, so that they can include them on the disks.□

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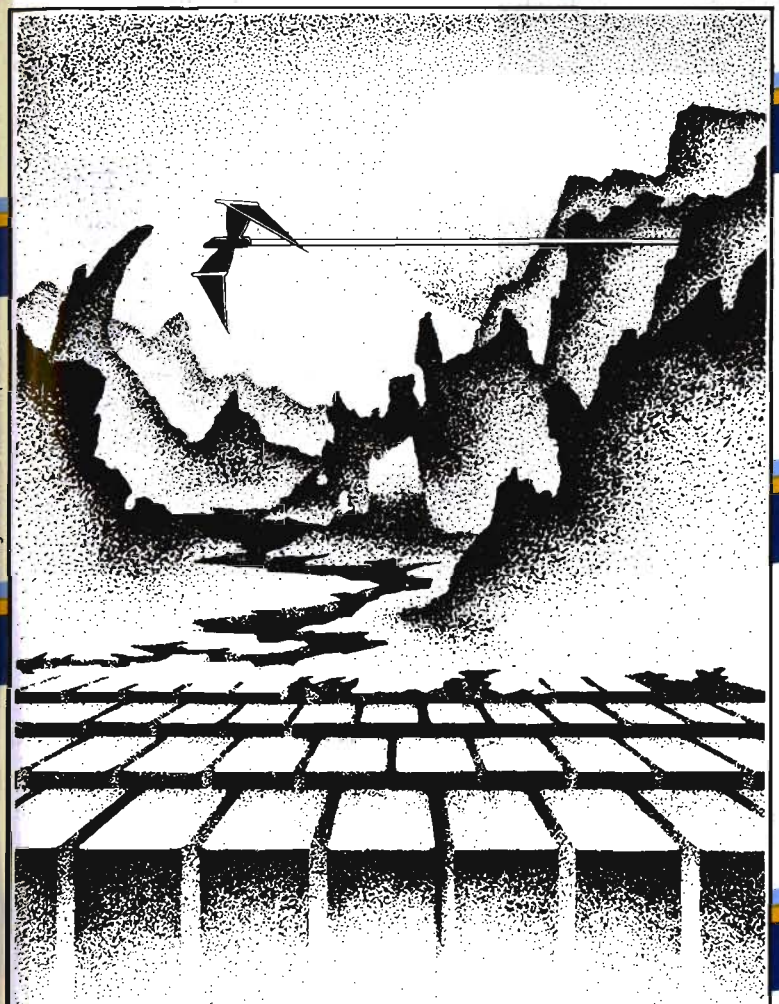

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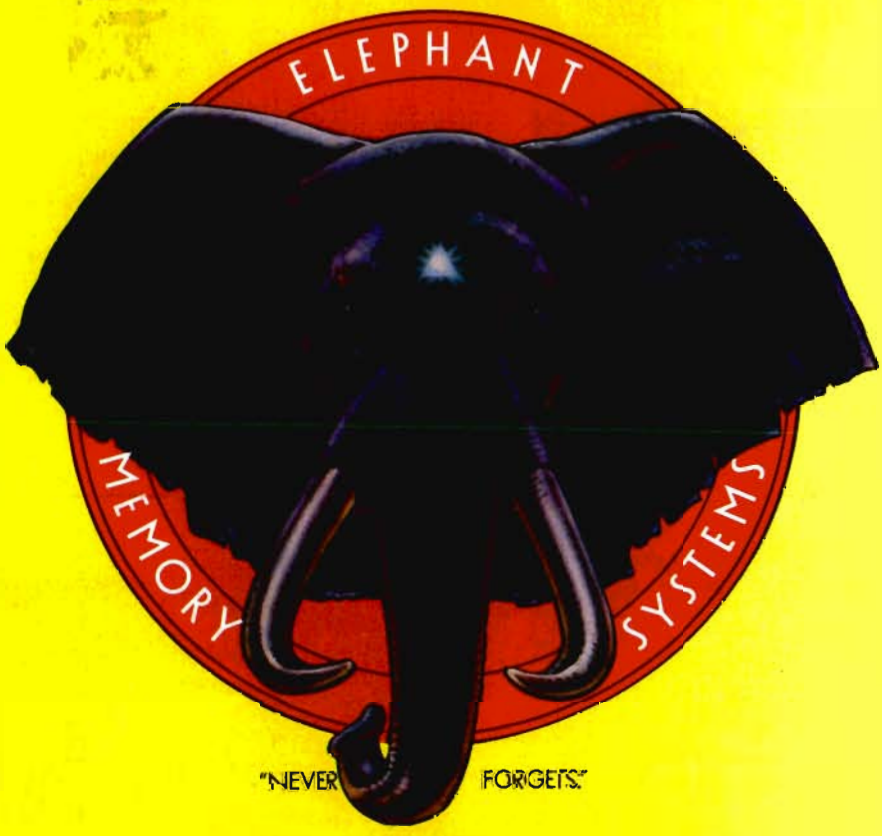

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Specifically, subcommittee X3B8 of the American National Standards Institute (ANSI) says so. The fact is all Elephant™ floppies meet or exceed the specs required to meet or exceed all their standards.

But just who is "subcommittee X3B8" to issue such pronouncements?

They're a group of people representing a large, well-balanced cross section of disciplines—from academia, government agencies, and the computer industry. People from places like IBM, Hewlett-Packard, 3M, Lawrence Livermore Labs, The U.S. Department of Defense, Honeywell and The Association of Computer Programmers and Analysts. In short, it's a bunch of high-caliber nitpickers whose mission, it seems, in order to make better disks for consumers, is also to make life miserable for everyone in the disk-making business.

How? By gathering together periodically (often, one suspects, under the full moon) to concoct more and more rules to increase the quality of flexible disks. Their most recent rule book runs over 20 single-spaced pages—listing, and insisting upon—hundreds upon hundreds of standards a disk must meet in order to be blessed by ANSI. (And thereby be taken seriously by people who take disks seriously.)

In fact, if you'd like a copy of this formidable document, for free, just let us know and we'll send you one. Because once you know what it takes to make an Elephant for ANSI . . .

We think you'll want us to make some Elephants for you.

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